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AUTOMOTIVE INDUSTRIES

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# More Accurate and Sensitive Statistics Will Smooth the Way to an Even Sales Curve

By Herbert Hosking

PALLIATION or prevention? Two weeks ago, in a paper characterized by brevity and succinctness, Dr. Royal S. Meeker redefined these terms in their relation to the problem of unemployment, before a session of the annual meeting of the American Society of Mechanical Engineers. A breath of healthy skepticism wafted through the halls of the Engineering Society's Building, as Dr. Meeker, with certain touch, swept aside most of the suggested and operating "remedies" for existing unemployment in industry, into the class of palliatives, necessary from the humanitarian standpoint, but futile and expensive from the standpoint of permanent relief.

Among the palliatives of varying value he listed the dole system, furnishing of odd jobs during periods of general unemployment, the "buy it now" complex, wage maintenance by reducing the number of employees and introducing production economies, artificial stimulation of public works, and p r o d u c t i o n regularization plans limited to particular industries, plants, or localities.

In the latter connection he pointed out that regularization programs, to be effective, must include all the industries in the country, and eventually, in the world.

In pointing toward permanent amelioration of seasonal and cyclical unemployment, Dr. Meeker divided his program into three parts, as follows:

1. Planning production to meet the estimated requirements of consumption.

2. Stabilizing the general price level; that is, the purchasing power of money.

3. Providing carefully planned, all-inclusive unemployment insurance to pre-

**SQUARELY facing the motor vehicle industry is the need for closer study of the family and the individual as economic units. In the economic welfare of these lies the solution of the problem of seasonal stabilization of sales and the regularization of production and employment.**

vent unemployment, as well as to care for the unemployed.[1]

That the manufacturer of motor vehicles has a strong interest in the purchasing power of the country was pointed out by the author of this article a few months ago; when it was shown that passenger car sales have a tendency to follow the seasonal fluctuations of a number of monetary items representative of the liquid capital of the individual purchaser. With the reduction in the general level of purchasing power there has naturally been a reduction in the demand for motor vehicles.

Inability of the automotive industries to foresee and allow for this reduction in demand is traceable, not so much to the lack of accurate statistical information, the first desideratum in Dr. Meeker's program, but to the tendency of the industry to regard the passenger automobile as a sort of sacred elephant among commodities; something not amenable to ordinary economic laws.

It is the psychology of the drive-away versus the psychology of the carload shipment. In the latter case the automobile is an inert "unit" in a manufacturing program. Its personality is sheathed in a packing case, and identified only with a waybill.

## The Psychological Attitude

In the former instance, the individual car is placed under the care of an individual, who immediately becomes responsible for its behavior. This personal interest of the individual in the commodity is characteristic of few economic relationships.

A fundamental revision in the psychological approach of the automotive industry to its final products would, then, go a long way toward attaining the industrial stability which is a concomitant of continued employment and continued profits.

There is, with this, a need for more accurate, more sensitive statistics, and a wider exchange of information pertinent to the welfare of the whole industry. Until the recent past, for example, reliable information on passenger car production and sales has been six-weeks cold before it was placed before the industry in a form to be of value. Between reporting periods the industry has been dependent on straws, so to speak, which indicate which way the wind is blowing, but not its velocity nor the area which it covers.

It is only recently, again, that accurate information on foreign markets has been gathered in a form which will prove useful to the industry. Export executives have been chosen usually for their personal knowledge of a limited territory, rather than for their statistical knowledge of secular trends and other relevant information. From the standpoint of regularization of production and employment, the chief potential value of foreign markets to the automotive industries lies in the possibility that they may be made to serve as seasonal correctives of waning domestic sales. Low seasonal sales in the January-February domestic market may be at least partially balanced with increased sales in a foreign market whose January-February seasonal sales trend is the opposite of our own.

Convenience and the ubiquity of American advertising media have often dictated that sales and advertising efforts in foreign markets shall be timed as closely to such efforts in the domestic field as the distance from centralized control will permit. There are many arguments, even a metaphysical one, to show that foreign markets, particularly in the Far East, offer a tremendous potential sales field to the American manufacturer of motor vehicles. That these relatively undeveloped areas should be allowed to develop along hit-or-miss lines, furnishing a new problem in regularization of production, is unthinkable.

## Price Reduction Too Much

The general reduction in the productivity of industry and the consequent reduction of the purchasing power of a large mass of the population which has been characteristic of the last few months, has been accompanied by greatly reduced sales of passenger cars. What is the result? Passenger car prices have been reduced, with a more than reciprocal reduction in the net earnings of passenger car manufacturers. The writer has calculated that in terms of the average passenger car price of December, 1929, the average price of December, 1930, is 80.5. This is conditioned somewhat by a larger public acceptance of cars in the lower price brackets, but analysis of the averaged prices of individual manufacturers shows that actual price reductions have, in many cases, been comparable with this figure. In some cases, as indicated in the latest available net earnings figures of the companies involved, these price reductions must have been perilously close to the profit line.

Such reductions have been reflected in diminished employment, and diminished real earnings of workers in the motor vehicle manufacturing industry and its tributaries. It is said of the automotive indus-

[1] See report of A.S.M.E. Annual Meeting, by Joseph Geschelin in Automotive Industries for Dec. 13.

try that ten per cent of the country's workers are directly or indirectly dependent upon it for livelihood. A reduction in the productivity of the industry and the real earnings of its workers must then have a tremendous effect on the purchasing power of the country. Price reductions which tend to menace this purchasing power should not be undertaken without deep study of the trend of consequences involved. Ill-advised price reductions put the industry somewhat in the position of Alexander the Great, who, in cutting the Gordian knot, presumably rendered a section of the rope involved, unfit for any further use.

The immediate cost to a particular industry of seasonal irregularity of production, is largely measured in terms of interest and depreciation, items nearly interchangeable. The hazard of reduced purchasing power on the part of unemployed workers is too often overlooked, both with respect to the particular industry, and the general economic scheme.

Overproduction is the result of the productive process outstepping the available supply of money and credit. With the tremendous capital expansion and increased productivity of the motor vehicle manufacturing industry in the last few years, there has been a tendency to believe that the general purchasing power was keeping pace. There is perhaps good reason for this found in the fact that the first generalized analysis of purchasing power in terms of real wages did not appear until the early part of this year.(2)

Herein is found abundant evidence that previous cost of living indices have underestimated actual values, that the real wages of workers in industry have not increased in proportion to the physical productivity of industry, and that the secular trend of the relation of real wages to the value of manufactured products has remained fairly constant.

Squarely facing the motor vehicle industry is the need for closer study of the family and the individual as economic units. In the economic welfare of these lies the solution of the problem of seasonal stabilization of sales and the regularization of production and employment. A life insurance company whose operations touch one out of every five families in the United States has found this necessary and expedient.

It is logical that the passenger car industry, which touches a much larger proportion of families, and the purchase of whose products represents a proportionately larger expenditure on the part of the individual or family, should undertake the same task.

How the mass of the people fares will determine the future of the automobile. The problems are inseparable.

(2) "Real Wages in the United States," by Paul H. Douglas, professor of Industrial Relations in the University of Chicago. New York and Boston, 1930. A publication of the Pollak Foundation for Economic Research.

# Bohn Connecting Rod Cap With Heat Dissipating Feature a New Development

IT is obvious that if additional heat-dissipating facilities are provided for the connecting rod head of a high-speed engine, the operating temperature of the bearing can be reduced and the risk of a burnout minimized. It is for this purpose that the Bohn Aluminum & Brass Corp. has developed and is offering for original equipment an aluminum alloy connecting rod cap provided with reinforcing and heat-dissipating fins. The use of these caps results in a lowering of the temperature of the bearing surfaces, due to the higher heat conductivity of the aluminum alloy and to the greater heat-dissipating area of the cap, which must be of increased size for equal strength as the steel cap which it replaces. Besides, the greater air turbulence produced in the crankcase by the finned connecting rod head is claimed to make the latter the best heat-dissipating means for the rod as a whole.

Thus the aluminum connecting rod offers many of the advantages of a complete aluminum rod. Use of aluminum for the cap does not add to service difficulties, as by making it impossible to remove piston assemblies through the crankcase, and in case of failure of the lubrication there would be less danger of injuring the crankpin with the aluminum than with a steel cap.

As in the case of the aluminum alloy rod with steel cap, introduced by Bohn a year ago, the combination of steel with aluminum alloy provides for control of expansion, the steel mating part, through the bolts, holding the cap to shape. The bolts, by the way, are assembled with a dowel fit in the cap, while the cap clearance on the crankpin is specified as identical with that of a steel unit.

The new caps are forgings, of course. In tinning aluminum alloy parts such as these, for babbitting, the tin must be puddled on a fresh surface so that there will be no chance of oxides forming under it. Bohn claims to have a process by which this can be achieved without the usual overheating of the alloy. The latter of course would reduce the strength of the forging.

The caps are supplied by Bohn finish-machined, except for the final diamond-boring operation on the inside diameter, which is performed after the rod has been completely assembled.

An incidental advantage of the cap is a 50 per cent saving in weight for equal strength with a steel design, which is reflected in a reduced centrifugal load.

## In Step With Diesel Engine Developments

# Fuel Oil Must Have a Low Free of Acids and Alkalies

**Vaporization, gumming and detonation characteristics although of importance in gasoline engine fuels have no bearings on the value of Diesel Engine fuels**

AIRCRAFT Diesel engine fuels were discussed in a paper presented at the eleventh annual meeting of the American Petroleum Institute in Chicago on Nov. 12 by W. H. Graves, Packard Motor Car Co. Mr. Graves' paper, of course, dealt more particularly with the fuels required for aircraft Diesels, but the requirements with respect to fuels for other types of automotive Diesel engines are very much the same.

In connection with his paper the author showed a sectional view of the fuel injector pump, which is reproduced herewith. Concerning the operation of this pump he said:

"The injector pumps, which are of the plunger type, work from a cam and deliver a given volume of oil to each cylinder. The volume delivered depends upon the length of stroke of the pump which, of course, is adjustable by opening or closing the 'throttle.' Therefore, the speed of the engine is controlled by the amount of fuel injected. The volume of oil pumped must, of course, be constant for a given stroke, and at the same time the oil should be well atomized. This is accomplished by having the outlet orifice of the pump adjustable with the viscosity of the oil. This is done with a spring-loaded plunger."

Fuel requirements for automotive Diesel engines may be discussed under the following heads: Flow from tank to engine, starting ability, power output, wear on engines, storage and safety. Vaporization, gumming and detonation characteristics, which are highly important in the case of gasoline engine fuels, have no bearing on the value of a Diesel engine fuel. Petroleum refiners appear to have no difficulty in supplying fuels meeting all requirements of aircraft Diesel engines, which latter are built to burn the cheapest fuel that can be safely handled and which is widely distributed.

A study of available fuels was made just previous to the completion of the design of the Packard Diesel engine, and it seemed that oils sold as domestic furnace oils were suitable. While specifications laid down by the American Oil-Burner Association do not necessarily give a satisfactory aircraft Diesel fuel, because of the pour point, most of the fuels sold under these specifications are satisfactory.

One of the most important requisites of a fuel oil is that it will flow from the fuel storage tanks to the circulating pump through a relatively small tube at any temperature at which a plane may be operating. Thus for cold-weather operation it is necessary that the fuel have a low pour point and low viscosity. Aircraft engines sometimes operate at extremely low temperatures, even at minus 75 deg. Fahr.; but this is an extreme case for which, of course, special fuels could be obtained. The majority of domestic furnace oils have a pour point or freezing point of between minus 30 and minus 50 deg. Fahr., and this is quite satisfactory for general commercial work.

To start the engine it must produce a sufficiently high temperature to ignite the fuel spontaneously, or the fuel must have a sufficiently low spontaneous ignition temperature to be ignited by the heat produced in the engine.

The difference in spontaneous ignition temperature of the various fuel

### Essentials of a Diesel Aircraft Fuel

1. A distilled fuel.
2. A pour point and viscosity low enough to flow to the engine at temperatures encountered in service.
3. A flash point over 150 deg. F.
4. No acidity, alkalinity or grit.

# Pour Point and be

oils tested by the author's firm was not sufficient to lead to any trouble with starting or operating the engine. The autogenous ignition temperature of the fuels that have been used is about 500 deg. Fahr., when taken by the A.S.T.M. tentative method of test for the determination of autogenous ignition temperature.

Carbon disulfide has an appreciably lower spontaneous ignition temperature (275 deg. Fahr., by the same test), and in actual operation of the engine will ignite in much colder weather, but it does not have sufficient heat content for engine operation. It may also be pointed out that the ignition temperature is independent of the flash point, the fire point, the distillation range and other properties by which gasolines are judged.

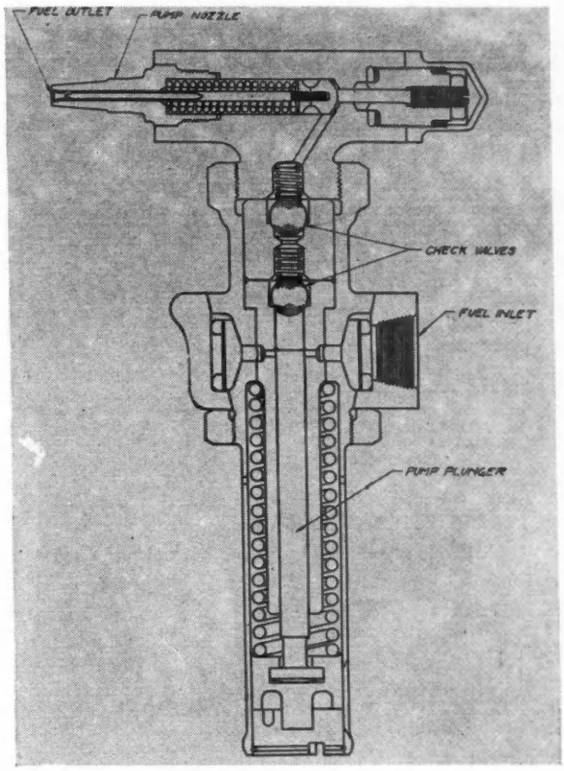
The Packard engine is equipped with "glow plugs," heated to incandescence by electric current, but they are used only for starting in cold weather.

The power obtainable from any fuel depends upon its heat content and upon how completely it is burned in the engine. The heat content of petroleum products is roughly proportional to their specific gravities. Thus, with a low A.P.I.-gravity fuel there are fewer heat units per pound than with a high A.P.I.-gravity fuel; but, on the other hand, the heat units per gallon are higher. An airplane equipped with a 225-hp. Packard Diesel engine requires about 70.3 lb., or 9.65 gal. per hour of a 30-deg. A.P.I. fuel oil, and 69.7 lb., or 10.12 gal. of 40-deg. A.P.I. fuel oil per hour at cruising speed. Thus, for a 10-hour flight with the low-gravity fuel six more pounds would be required, but 4.7 gal. less. This difference is not important.

The efficiency of combustion is dependent upon the design of the engine and upon the characteristics of the fuel. The engine being designed to give excess air, to atomize the fuel finely, and to produce the necessary turbulence for the proper mixing of the fuel and air, any distilled fuel can be burned in it, but it is not considered advisable to burn undistilled fuels, because residual matter in them might not burn and cause troublesome deposits.

Fuel to be carried in the tanks of an airplane must be neutral; if it were either acid or alkaline it would be apt to corrode the aluminum fuel tanks and cause trouble by plugging the fuel lines or screens.

One of the chief advantages connected with the use of Diesel engines for aircraft is that they practically eliminate the fire hazard, but to insure this advantage the fuel used must have a high flash point. Experience indicates that there will be no trouble if the fuel has a minimum open-cup flash point of 150 deg. Fahr., and it is hoped that no fuels with a flash point lower than this will be marketed.




Fuel injection pump of Packard Diesel Engine

Diesel fuels must, of course, be sufficiently free from gum-forming constituents so that the fuel tanks, fuel line and screens will not become plugged. However, rather poorly refined oils burn satisfactorily and do not leave any injurious deposits that have yet been found.

Diesel engines do not exhibit the same detonation characteristics as high-compression gasoline engines. Detonation, or preignition in gasoline engines, may be due to various causes, but heat of compression and speed of burning are responsible for considerable trouble. The heat of compression is necessary in a Diesel engine to ignite the fuel. The speed of burning is controlled by injecting fuel over a rather wide range; and, for this reason, crudes which give gasolines of high anti-knock value appear to be of no advantage in a Diesel engine as now developed. Fuels produced from different crudes pro-

## Diesel Engine Fuel Specifications

| | |
|---|---|
| Gravity at 60 deg. F. | 37 to 42 deg. A. P. I. |
| Flash point | 150 to 180 deg. F. open cup |
| Color | White to 1½ N. P. A. |
| Viscosity at 100 deg. F. | 32 to 35 Universal Saybolt |
| at 0 deg. F. | 45 to 50 Universal Saybolt |
| Distillation: | |
| Initial | 348 to 430 deg. F. |
| End point | 490 to 600 deg. F. |
| Pour point | — 30 to — 80 deg. F. |
| Ash | None |
| Acidity | None |
| Alkalinity | None |

duce similar results in the engine. Recent tests indicate, however, that anti-knock fuels may allow shorter injection periods and thus to improve the thermal efficiency. Producers of Diesel fuel oils should work toward producing anti-knock fuels if possible.

The term "gravity" is used to a great extent in describing fuel oil, but it actually has very little significance in a Diesel fuel other than that pointed out under power output. It is not essential to purchase or use fuel of a certain gravity except insofar as trade custom demands.

The flash or fire point is one of the most important tests for aircraft Diesel engine fuel. This is true not because of any influence on engine operation, but because of its effect in minimizing the fire hazard. The flash point should be over 150 deg. Fahr.

The viscosity of the fuel is important, and again not from the engine-operation standpoint, but from the fact that it must be low enough at the operating temperature of the plane to flow through a small tube at a rate equal to five times that at which fuel is consumed by the engine. This is approximately 50 gal. per hour with the present engine.

Tests to date have not definitely determined what viscosity will give the desired flow with each engine installation. The gravity head on the circulating pump and the length of the oil tube are factors which must be taken into consideration. Most oils on the market coming under the classification of light domestic fuel oil have a Saybolt Universal viscosity of only 50 at 10 below 0 deg. Fahr., and of 32 at 100 deg. Fahr. Thus, the slope of the curve shows this viscosity to be satisfactory until freezing takes place.

The pour test for fuel oils is of great importance. A fuel that has a pour point higher than the air temperature at which the plane operates will not flow to the engine; and, thus, no power will be developed. It is of importance that this property be watched. The pour point on most present domestic fuel oils is more of a freezing point than a pour point, and at a given temperature these fuels almost freeze solid. It is important that this point be watched, to make sure that the freezing point is well below the atmospheric temperature at which the plane is operating.

The distillation range or volatility of Diesel fuels has no effect on engine starting, fuel distribution, acceleration and other engine characteristics. Sulphur in amounts up to 0.5 per cent has shown no deleterious effects on the engine, and this is considered a satisfactory limit. Water and sediment are not desirable in any fuel, but the 0.05 per cent limit specified for domestic fuel oils is permissible for Diesel fuels. Ash is important as an indication of grit or foreign matter in the fuel that might cause wear in the engine. There should be no ash left after burning the oil. The color of the oil is of no consequence provided it meets all of the other tests.

In concluding his paper Mr. Graves enumerated the characteristics of the fuels (see table) which has been found satisfacory in the Packard Diesel engine, at the same time pointing out that he did not intend this list of properties as specifications of Diesel engine oils.

# Transportation in Spain

IT is pointed out in a recent British official commercial report that under the government of General Primo de Rivera attention was devoted to road transport in a way which had not previously been seen in Spain. A scheme of arterial roads has been prepared, and the work of widening existing thoroughfares undertaken. This improvement scheme has opened up the country in such a way that the policy of road transport expansion will, in all probability, be carried out by future governments to an extent commensurate with the funds available for it. The development of maritime communication has also received consideration. Contracts were recently invited for trans-oceanic services to New York, Argentina, the Pacific ports, and to Spanish colonial possessions. Increasing advantage is being taken of commercial aviation. The services are maintained by a company of which one-third of the capital is held by each of the three interests—the Spanish banks, the air line organizations and the constructors of aeroplanes.

Airports are in the course of construction or nearing completion at Madrid, Seville, Burgos and Barcelona, and preparatory work is in progress at Valencia, Vigo, and Irun.

# JUST AMONG OURSELVES

## Why They Buy—What They Buy

TO those who believe in the survey as an invaluable merchandising guide, Edward L. Bernays, one of the high priests of modern publicity, gave something to think about when he said recently in a speech:

"Men are rarely aware of the real reasons which motivate their actions. A man may believe that he buys a motor car because, after a careful study of the technical features of all makes on the market, he has concluded that this is the best. He is almost certainly fooling himself.

"He bought it, perhaps, because a friend whose financial acumen he respects bought one like it last week; or because his neighbors believed he was not able to afford a car of that class; or because its colors are that of his college fraternity."

## Choice Guesses and Real Reasons

MR. BERNAYS most certainly is right when he says that men are rarely aware of the real reasons which motivate their actions. That is one reason why the direct questionnaire survey is likely to be quite misleading when applied to certain types of problems.

Nevertheless, the problem remains. The modern manufacturer-seller today is not content to guess about these real reasons; nor even to accept the guess of experts—people who devote themselves to trying to make guessing scientific.

Yet guessing remains the general rule, because nobody has yet found a practical means of developing in mass the relative proportions of these "real reasons" which motivate men subconsciously. Qualitatively they are well known and pretty well understood by astute merchandisers; quantitatively, however, they still remain in the limbo of little known things.

Which reminds us that we would like to hear a debate about these motives some time between Mr. Bernays and Stuart Chase.

## 'Twas the Doing That Counted

ON Thanksgiving Day the New York World printed the following editorial:

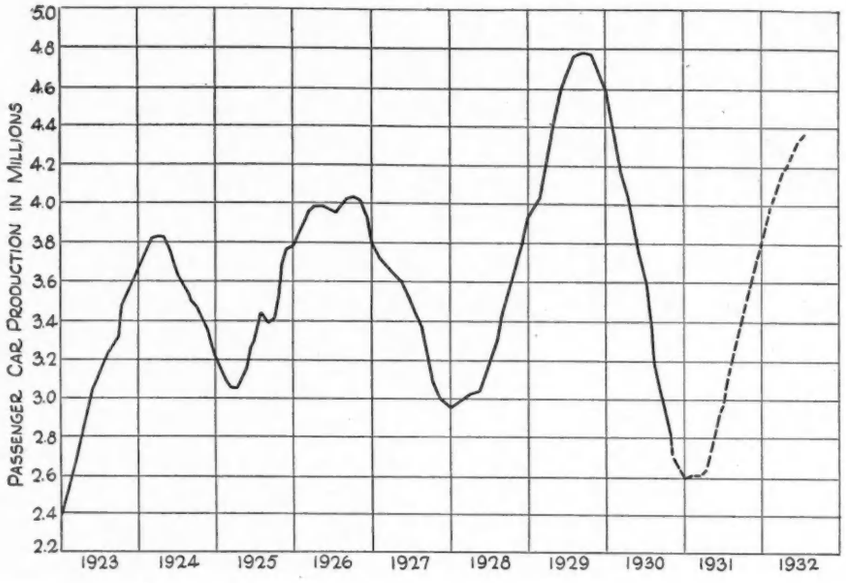
Miss Rosemary O'Connor, thirteen years old, arrived in Buffalo the other day to find that she was suddenly on her own. Her father was to meet her, but her telegram to him was not delivered, and so she was unexpectedly faced with the problem of how she was to eat, sleep and be clothed. She went to the Young Women's Christian Association, took a room for the night, and paid for it. This left her 35 cents. With this capital she went to a store and bought Christmas postcards at a cent apiece. Then she went to a street coroner and sold all her cards at five cents apiece. Going back for more, she went to the street corner again and sold them too.

With the profits of both ventures, she now went into a restaurant and ate. Then, going along the street, she saw a sign in front of a theater giving notice that it was amateur night. She bought a ticket, went in, and circulated through the audience, telling the people she was going to put on an act and asking them to give the little girl a hand. Then she went on the stage, sang two songs and danced, and was applauded so loudly that she received the first prize, $1.50.

Then she went to her room and to bed. The next day the police, egged on by a frantic father, located her, and found that she was planning to attend another amateur night.

Now what arrests us about all this is not the young lady's pluck. With a name like Rosemary O'Connor she would naturally have pluck. It is rather her incredible decisiveness. Most of us in her situation would take a seat on a park bench and think of twenty schemes, all more or less feasible, but we would put none of them into execution. Eventually we would go around to the police station, confess our plight, and let the sergeant start us on a round of the aid societies that give bewildered people their bearings. But not Miss Rosemary O'Connor. The moment a plan occurred to her, she acted on it, and the moment a second plan occurred to her she acted on that. We must say she commands our admiration.

Few automotive executives can match the resourcefulness and determination of Rosemary O'Connor. She didn't sit on a park bench nor call for assistance. She got a fair idea and executed it vigorously.—N.G.S.




Cumulative U. S. passenger car production for year ending the first of each month

by

**Edmund B. Neil**

Director of Research, Chilton Class Journal Co.

# Production Trend Indicates An Throughout 1931 and Normal

**This is the second of a series of articles forecasting the probable production in the Automotive Industry's future. Subsequent articles will appear in early issues**

IN the first of this series of articles in last week's issue of *Automotive Industries*, we showed how total passenger car registrations may be expected to increase for the next decade. Let us now consider the immediate prospect of the industry and see what the projected curve of production activity tells.

Chart 1, shown on this page, was plotted to show trends of United States production, the points showing cumulative 12-month total ending the first of each month.

This method was used to obtain a picture free from seasonal variations and minor deviations from trend, which are sometimes confusing. These deviations frequently seem so important that they are often read as indicating improvement or decline when such conclusions are not justified.

This curve in Chart I:

1. Indicates clearly the three-year or 40-month cycle of production.*

2. Shows that upturns are followed by depressions to a degree relative to the value of the upswing preceding and following the rises.

3. Indicates that the turning point in the present depression is not far distant, since apparently the present recession has nearly exhausted itself. It will be noted that the level of production is lower than the point at the end of 1927.

4. Shows that apparently the loss of production has approximately balanced the gains of 1928 and 1929, which will, in turn, strengthen the automotive market about the first quarter of 1931, with more tangible evidences of improvement making themselves manifest soon thereafter.

Generally speaking, we may take this curve to indicate that gradual improvement in production will continue throughout 1931, beginning with the first quarter, and by the beginning of 1932 the normal line will have been reached or passed.

It would seem that the change in this upswing would occur some time during the fall of 1932 and that another recession in production would follow.

Just how high this peak will reach and how long

**Automotive Industries*, Nov. 8, 1930, page 673. It was shown that production follows the trend and cycles of general business activity.

it will continue cannot, of course, be accurately determined. It would seem that this would depend to some degree upon what the manufacturers have learned from the present depression. Changed thinking on the part of executives may lead to more level production in the years to come; leveling out of production would mean that depression valleys would be less deep and less shorter in duration.

This chart is not presented as an absolute guide to future passenger car production. It takes into consideration basic factors which have been compiled to make a statistical presentation of past performance and projected forward to

# Improvement Output by 1932

indicate what may be reasonably expected in production of passenger cars.

In order to serve as an actual prediction, one would have to read into this chart other factors, many of which are constantly changing, which control to some extent the economic destinies of the country. Some of these factors are unknown; others, like the stock and securities market activity, commodity prices, export situation, national income and standards of living, can be measured. It is these known and measurable factors which must be read into any basic trend chart if we are to make accurate predictions.

A careful tracing of the curve of activity of the stock market shows that the general business depression of 1929 was clearly anticipated in April and May of that year, although not until the debacle in Wall Street was the seriousness of the situation brought to general attention.

It has since been pointed out that many new influences had made themselves a part of the economic picture. One of these was the large volume of stock market business done by thousands of "uninitiated" investors. Millions of dollars were poured into the market, causing prices to recover from the brief recession to new highs just prior to the sudden and extreme drop.

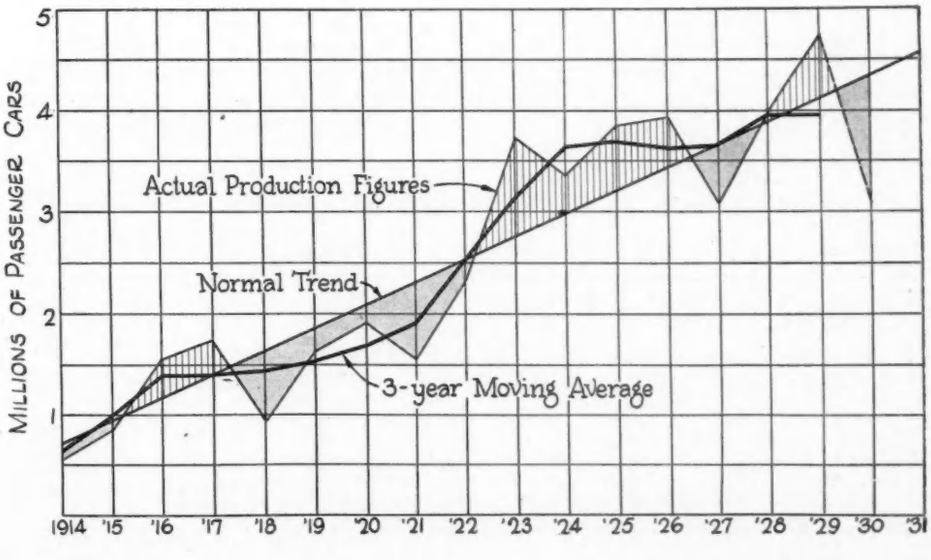
This delay in the arrival of the general depression was one of the reasons why the general business slump has reached its present low level, and why the present depression has been so prolonged.

A study of deviations from normal in U. S. and Canadian passenger car production (Chart 2) shows that 1930 will see about 3,050,000 automobiles off the assembly lines. This will be a drop of approximately 1,292,000 cars from the normal of 4,342,000 units.

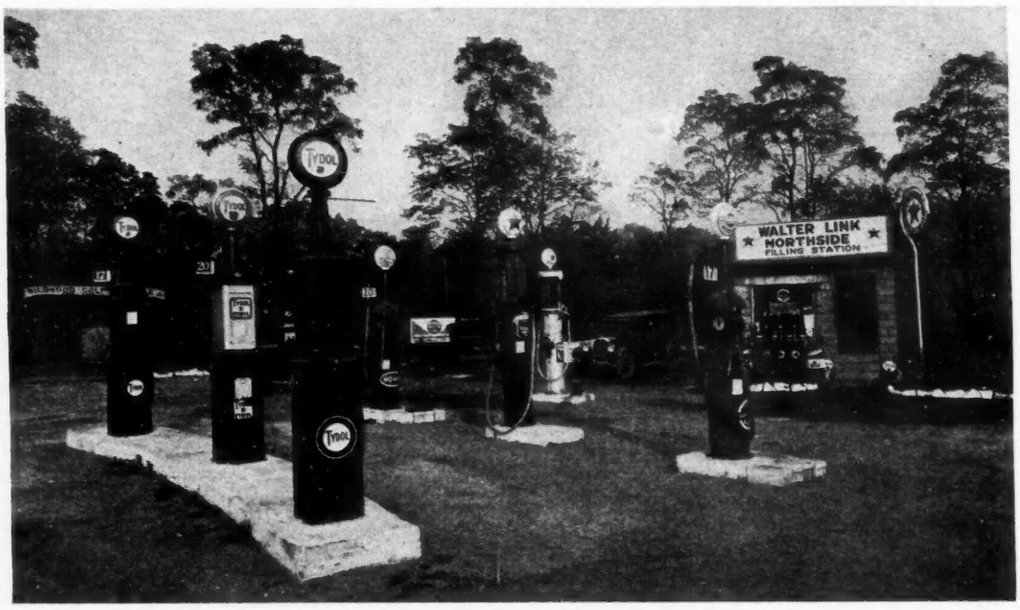
More important, this chart confirms the picture shown by Chart 1, namely, that the recession of 1930 has offset the 1928-29 gain of production over normal. This chart indicates that 1931-32 will see production return to and pass the normal.

Although this type of chart could be plotted with the normal line running horizontal and parallel with the bottom, the normal line in Chart 2 is shown as gaining from year to year, and thus the chart gives both the growth of the industry and the actual performance of each succeeding six-month period.

Data for this chart were taken from production figures since 1914. Prior to that year, production grew at such a tremendous rate that it was out of proportion with the present growth of the industry.




**The "below normal" production of 1930 has now balanced the "over normal" production of 1928 and 1929, pointing to an upswing**




Premium gasoline is available everywhere

# High Compression Engine Develops Distribution of Premium Gasoline

By A. Burdet Crofoot

EMPLOYMENT of premium fuels, practically unknown five years ago, has now reached a point where these fuels are available at almost all gasoline stations, according to a survey recently completed by the Ethyl Gasoline Corp. Approximately 42 per cent of the pumps along the principal highways of the nation are premium fuel pumps, and about 22 per cent employ Ethyl fluid as the premium element. This growth and availability of premium fuels has made possible the more general adoption of high-compression engines and given greater impetus to the production of high-powered engines.

The survey covered 27 routes selected in various parts of the country and involved drives along the principal highways between cities, totaling approximately 7000 miles. This survey may be taken as representative of the main traffic arteries of the country, in view of the wide area over which the counts were made. As the various counts were made by different individuals, there is some lack of uniformity as to the material tabulated, those counts being made in New England, in the Pacific Coast States and in the Mountain States, showing only the percentage of Ethyl gasoline and not taking into consideration other premium gasolines.

In the other 20 areas covered, however, an actual count was made of all premium gases as well as of Ethyl, and the same proportion, namely, 22 per cent Ethyl, holds on these routes, as was evident in the total of all counts made. It may be safe, therefore, to assume that the percentage of all makes of premium fuel may hold for the country as a whole and that 42 per cent of the pumps of the country are premium gasoline pumps.

In the trips a total of 23,391 pumps was counted, of which 5051 were Ethyl. On the routes where the count of all premium pumps was made, a total of 22,922 pumps was made, of which 9283 were premium and 4966 were Ethyl.

The greatest percentage of premium pumps was found in the East North Central States, Wisconsin, Indiana, Illinois, Ohio and Minnesota. In these states 48.6 per cent of the pumps counted were for premium fuel and 23.4 per cent Ethyl. Premium fuel was least available in the West North Central States on areas covered through Missouri and from Iowa into Utah. Here 29.1 per cent of the pumps were premium fuel.

Distribution of premium pumps in other sections of the country are as follows: Canada, 45.2 per cent premium; South Atlantic States, consisting of Maryland, Virginia, Florida, North Carolina and Georgia into Tennessee, 36.8 per cent premium; Middle Atlantic States, consisting of New York, Pennsylvania and New Jersey, 29.6 per cent premium; West South Central Section, consisting of Oklahoma, Texas and Louisiana, 29.4 per cent premium.

In the distribution of Ethyl, New England leads with 29.1 per cent. As no count of premium gasolines was made in this section, there is no way of telling whether the proportion holds for other premiums in this section or not.

# De Vaux Six—

## A New Car for the Lower Priced Field

By Athel F. Denham

NORMAN DE VAUX announced definitely this week that his organization, formerly Durant Motor Co. of California, has severed its relations with Durant Motors, Inc., and that Col. Elbert J. Hall, of Liberty Motor and Hall-Scott fame, has become allied with him to manufacture a new low-priced car that will be known as the De Vaux Six.

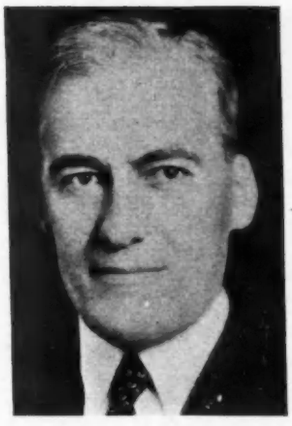
The Durant Motor Co. of California, of which Mr. De Vaux was president and general manager, is being incorporated as the De Vaux-Hall Motors Corp., to build and sell the new car on the Pacific Coast. A plant is being established in Grand Rapids, Mich., to manufacture the De Vaux Six for the middle western and eastern domestic territories, and export sales.

Norman De Vaux has been active in the manufacture and sale of automobiles since the early days of the automobile business. In the early days of Buick, he was one of W. C. Durant's lieutenants. Later he headed the Chevrolet organization in the West. As chief executive and half owner, he built the Chevrolet factory in Oakland, Calif., to supply Chevrolet cars to the coast states and the Orient. Later, when Durant, after leaving General Motors, launched his own company, De Vaux also left to enlist under the Durant banner. In recent years, as president and general manager of Durant Motor Co. of California, he has supervised the building and sale of more than 150,000 Durant automobiles for Pacific Coast and foreign consumption, this production extending over a period of slightly more than seven years.

Col. Elbert J. Hall brings to the new company a large fund of engineering knowledge, especially as regards engine design. He will be in charge of production at Grand Rapids and California. During the war he was active in the design and production of the Liberty engine. He then organized the Hall-Scott Motor Co.,

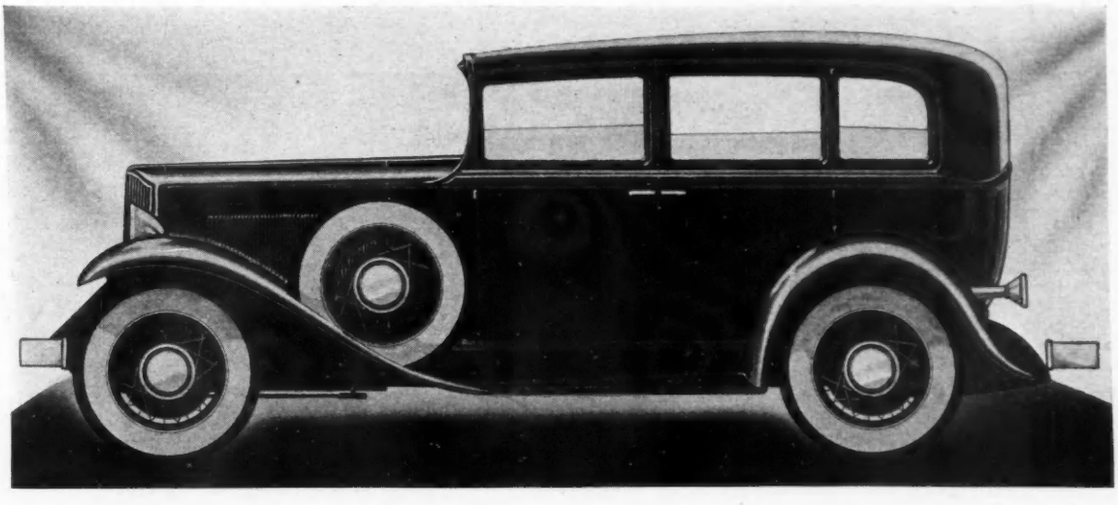
*(Turn to page 903, please)*

Norman De Vaux has severed his relations with the Durant Motors and is ready for production on a new line + + +



Col. Elbert J. Hall, a well known figure in engine design, has associated himself with the new enterprise incorporated as the De Vaux-Hall Motors Corp. + + + +

The De Vaux will be the first in the low priced field to offer a three-speed transmission with a double-high or silent second + + + + + + + + +



# Refinements in Budd Stamping Practice

## Roller leveling col works the sheets, producing permanent deformation in the microstructure to eliminate stretcher strains

SPECTACULAR tests designed to set new endurance limits for the all-steel body, a feature of the private showing of a motion picture film which we were privileged to witness, impelled the writer to study some of the manufacturing processes at the Philadelphia plant of the E. G. Budd Mfg. Co. Not only has this company pioneered all-steel body construction with its latest development of the one-piece body side, but they have also contributed to the art of electric spot welding, flash welding and the building of large stamping dies.

Probably one of the outstanding contributions to the metal stamping industry was the scholarly paper, "Success of Deep Drawing Operations on Strip and Sheet Steel Depends upon Microstructure," which was presented by Dr. George L. Kelley and Joseph Winlock, metallurgists of the Budd organization. This was published in *Automotive Industries*, Feb. 15, 1930. It covers in detail the causes and their remedies for certain chronic deep drawing problems such as spring-back, stretcher strains, brittleness and torn edges.

A striking view of the completed all-steel structure is shown in Fig. 1 which is an intimate view of a

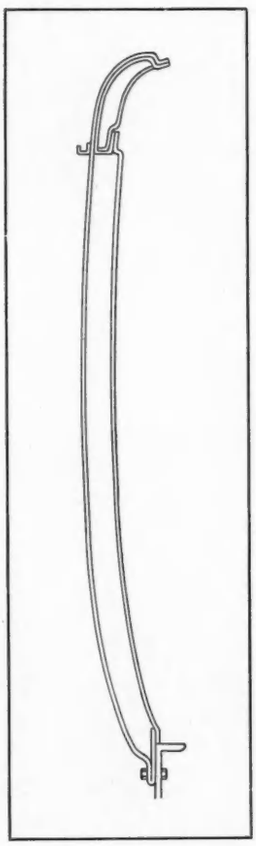


Fig. 2—A transverse section of the body pillar + + + + +

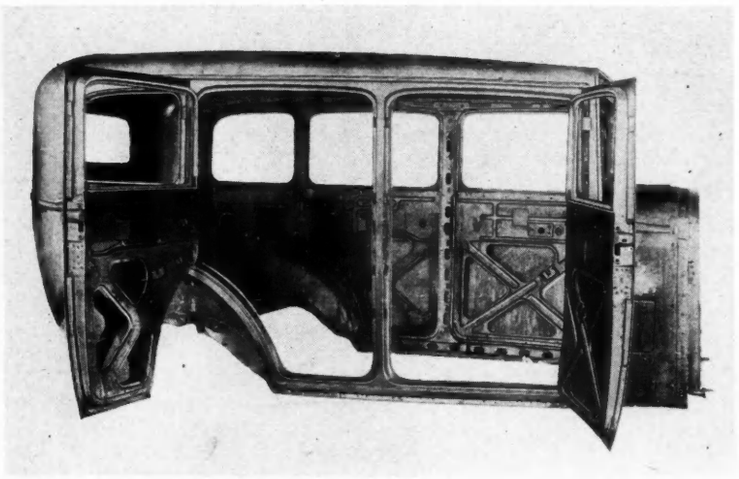


Fig. 1—A completed steel body as produced at the Budd Plant + + + +

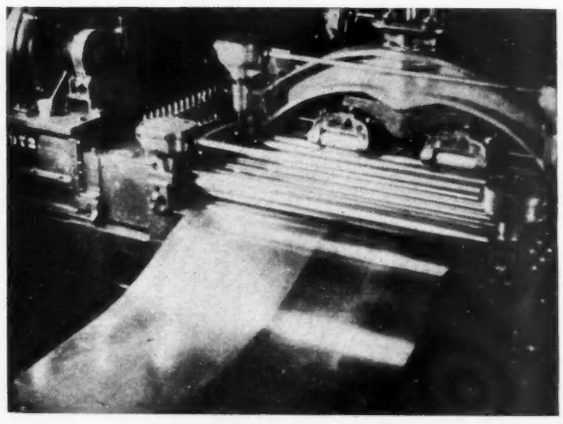


Fig. 3—Roller leveling is the initial operation on all sheets

# Are Developed by Research

by
Joseph Geschelin

current sedan body. Essentially the structure of the door and side panels consists of an outer panel and an inner panel welded together. In Fig. 2 is sketched a typical transverse section at a body pillar. This clearly illustrates the sill-less type of construction in which the body panel fastens directly at the neutral axis of the chassis side rail, eliminating body brackets and other fittings.

Based directly upon the research program described in the metallurgical paper mentioned above, the roller leveling setup in Fig. 3 is the initial operation on all sheets. Moreover, due to the short aging period (about 24 hours), the sheets are rolled right at the press line and used immediately. The function of the roller leveling is to cold work the sheet and produce permanent deformation in its microstructure so as to eliminate or at least minimize stretcher strains.

In a very sketchy way, the chief operations on the body press line are as follows: 1. First forming. In this operation, the entire side panel is drawn to its full depth, including the roof roll and wheel housing. 2. This is a preliminary piercing operation which blanks out the draw-hole in door and window openings. 3. Second forming operation, which completes door and window openings to their final dimensions. 4. A final trim operation to clean up door and window openings and the outside lines of the stamping. 5. This is the third forming operation whose function is to restrike the contour of the stamping, sharpen beads and radii and forms the stamping to final

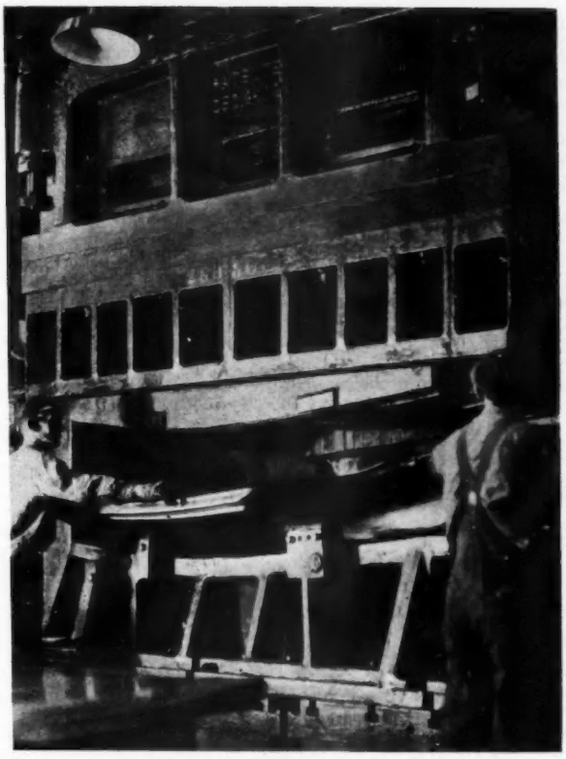


Fig. 4—One of the press operations at the Budd Plant + + + + +

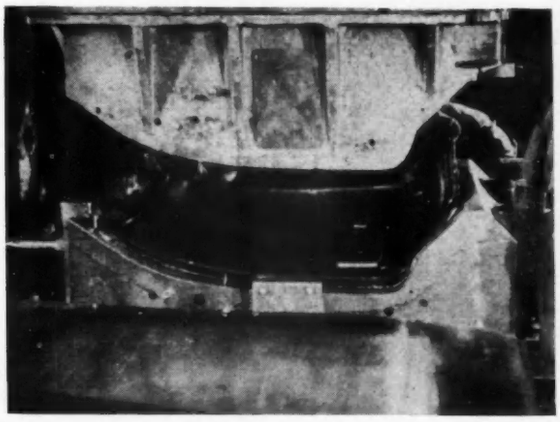


Fig. 6—This press stamps out the center rear panels + + + + + +

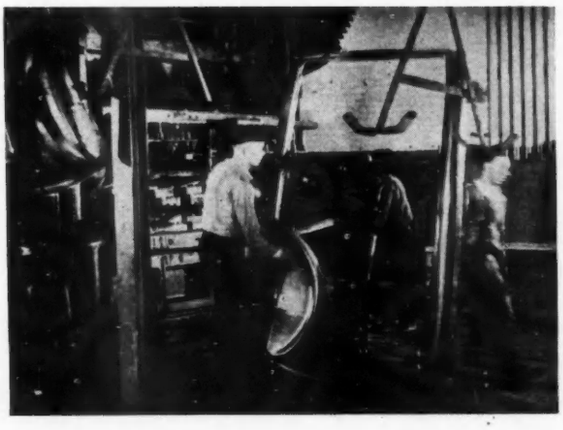


Fig. 5—(left) All departments are completely conveyorized + + + +

dimensions. 6. Form roof ends to produce an angle which carries the roof strip. 7. Form window opening into glass run channels. 8 and 9 are two piercing operations to produce hinge slots, hinge holes and bumper cut-out holes. Between the major forming operations, as the stamping is moved from one press to the next, sharp bends, corners and similar deeply drawn areas are annealed in a fixture containing clusters of gas burners properly located.

Side panels are of monopiece construction, the entire side being made from one single sheet. In this department, presses are arranged in two parallel rows in proper sequence. At the head of the line, the large sheets are roller-leveled and passed to a single blanking press, from which the finish blank is fed alternately to each row of presses. This arrangement is designed to produce right and lefts so as to maintain an even balance of stock. One of the press operations here is shown in Fig. 4.

All departments in the Budd plant are completely conveyorized, thus mechanizing handling operations. Fig. 5 shows a side panel as it is about to be hung on the overhead conveyor bracket. Another press operation, Fig. 6, shows the rear center panel with the dies open.

When the outer side panel is completely fabricated, it is assembled with the inside frame on the steel fixture, shown in Fig. 7, and tacked together electrically as shown. Final welding on this unit is accomplished on a battery of spot welders, one of which is shown in Fig. 8. This spot-welding department is laid out to provide a real production welding setup. The welders are arranged with varying throat depths and each welder handles only a certain definite section. During the operation, the structure is suspended in balance in an ingenious universal-type fixture which permits the operator to swing an entire body side into any position with utmost ease.

At the next stage, completely welded side panels and the back panel are flash-welded together in a large flash welder unit. A similar operation for welding the cowl assembly is shown in Fig. 9. This, by the way, is an unusual action photograph showing the shower of sparks set up as the flash takes place. The accuracy of the body stamping job as well as the fineness of alignment in the flash welding fixture is strikingly demonstrated in the next operation where completed cowl assemblies, including the roof header, which was not shown in Fig. 9, go through a restrike operation, the press accommodating two cowl units simultaneously. This operation assures absolute interchangeability, an essential of the Budd manufacturing process.

The final assembly of the major units of the all-steel body, namely the front section, and side-and-back units, is accomplished in a massive, master assembly fixture. Here the parts are carefully aligned to assure correspondence with the established dimensions. After being accurately clamped in place, the assembly is completed by gas welding the joints at roof and bottom sections. Incidentally, this is about the only place where gas welding is used at the Budd plant, as practically all other operations are mechanized, automatic where possible and in all cases accom-

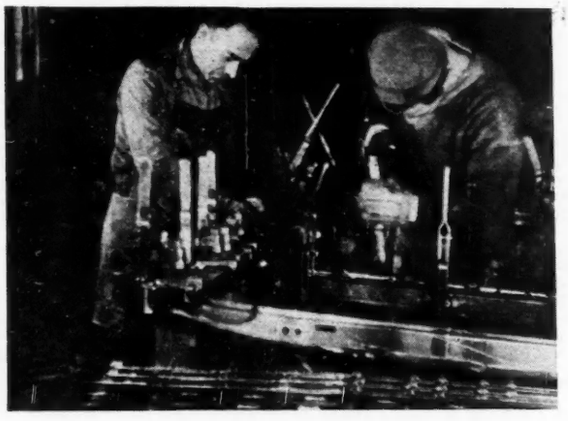


Fig. 7—When the outer side panel is completely fabricated it is assembled with the inside frame on a steel fixture

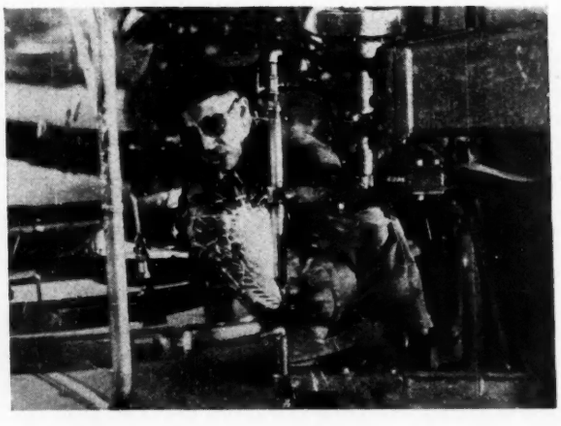


Fig. 8—Final welding in the assembly of side panels and frame is accomplished with a battery of spot welders + +

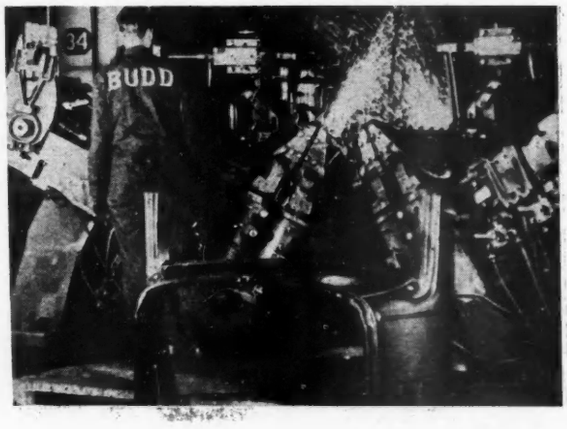



Fig. 9—(right) The cowl assembly is here being welded + + + + +

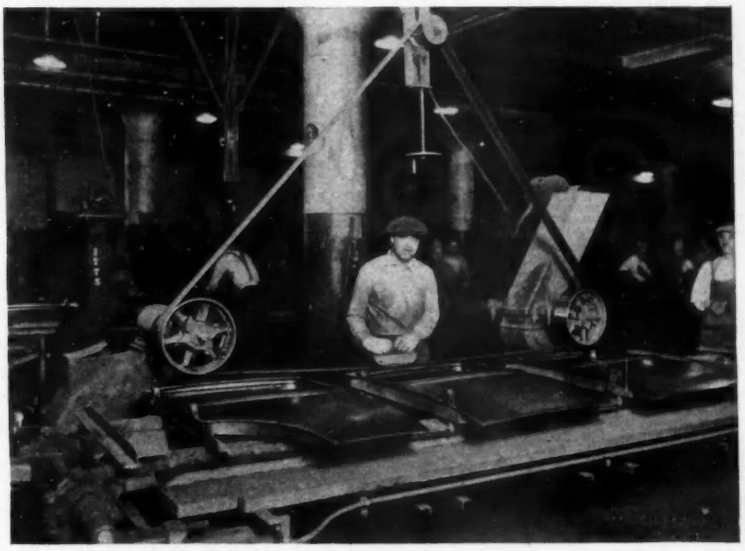


Fig. 10—An interesting view of the door finishing department + + + + +

plished by electric welding equipment.

Doors which are built by Budd for a number of automobile manufacturers are processed in a separate division. The door plant is completely conveyorized, thus providing a complete handling system from the press shop department to the shipping dock. Structurally the doors are made in the same manner as body panels, with an outer and inner panel permanently welded together. To assure interchangeability, all doors must pass a master inspection fixture consisting of a steel frame having the same dimensions as the door opening. The degree of precision is indeed remarkable and it really must be to assure perfect-fitting doors when it is remembered that many of these doors are assembled in other plants. An interesting view in the door finishing department is found in Fig. 10. Note the block used by the operator for depressing the polishing belt against the metal surface.

Before leaving the door plant, another outstanding feature of the conveyor system should be noted. As finished doors traverse the plant bound for the shipping dock or storage bins, the conveyor line passes through a long spray booth where the doors are coated all over with a rust preventative which preserves the metal during storage and in transit.

The foregoing gives in a rather brief, sketchy manner some of the points of interest along the body production line. Probably one of the outstanding features of current Budd bodies is the sill-less construction which accomplishes two important functions: Marked decrease in weight and the lowering of the center of gravity which is so large a factor in safety.

Before closing we want to mention several remarkable features of the film which was noted earlier. For one thing the safety feature of the lowered center of gravity was strikingly demonstrated by series of abnormally severe skidding tests. But the detail which left a vivid impression was that when the test car was rolled down an embankment, the window glass was absolutely intact except for one pane which was shattered when the body struck a concrete post. No other test could possibly show more effectively the structural strength and rigidity of this body.

# De Vaux Six—A New Car for the Low Priced Line

*(Continued from page 899)*

designing and building engines for passenger cars, trucks, buses and marine use. Col. Hall is a vice-president of American Car & Foundry Co. and has been consulting engineer for two of the largest automobile companies in the country. Engineering headquarters will be in Grand Rapids.

Col. Hall is responsible for the design and developed the six-cylinder 65 hp. engine with which the new De Vaux Six is to be powered. It will be one of the highest powered engines ever used in a car selling in the lowest price field.

The De Vaux will list at from $525 to $755.

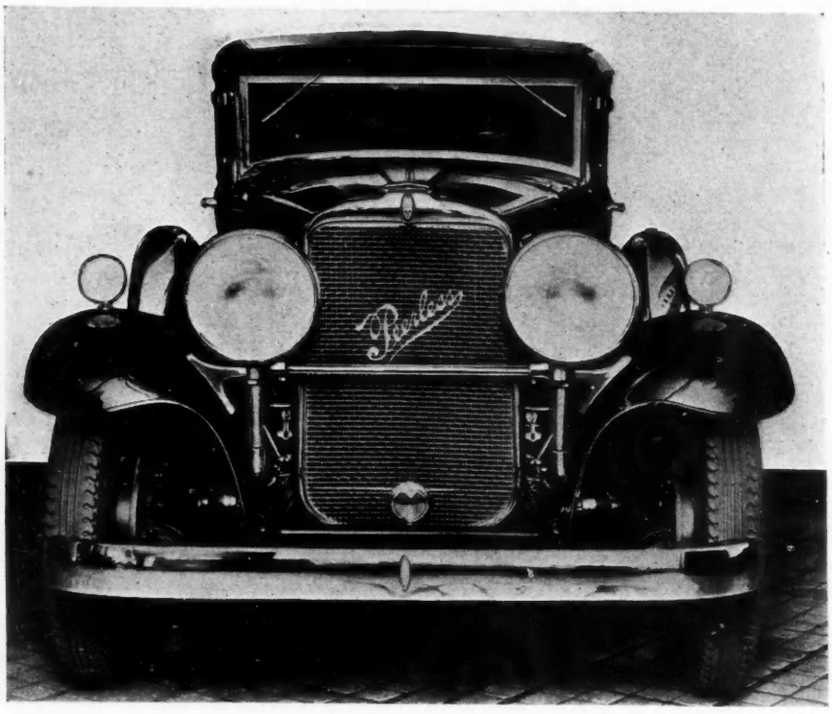
The engine will be manufactured by Continental Motors Corp. at Muskegon. Bodies, which are low, with a long hood and Vee-shaped radiator, will be supplied by the Hayes Body Corp., Grand Rapids. They were designed by Count Alexis de Sakhnoffsky. The first cars will probably be assembled in Grand Rapids within the next few weeks and it is expected that some models will be available for exhibition at the time of the New York show.

Col. Hall is supervising the manufacturing operations, and Mr. De Vaux is directing the organization of the merchandising program. Officials of the new organization state that already several hundred dealers have been signed to handle the new line.

A deal which is rumored to be pending would supply the De Vaux-Hall company with an established dealer organization to serve as a nucleus in the Middle West, South and East. This deal would give present dealers of an organization building cars selling from $1,000 upward the right to handle the new De Vaux Six.

The De Vaux will be the first in the low priced range to introduce the three-speed transmission with a double high, or silent second. There will be two sets of constant mesh gears, with engagement effected by the use of a sliding dog clutch.

Wheelbase of the new car is reported to be 112 in. Seats are adjustable. The engine will have a bore and stroke of 3⅜ by 4 in. for a piston displacement of 214.7 cu. in.




The new De Luxe Master line enters the picture of automobile offerings supplementing the former Master Eight series + + + + +

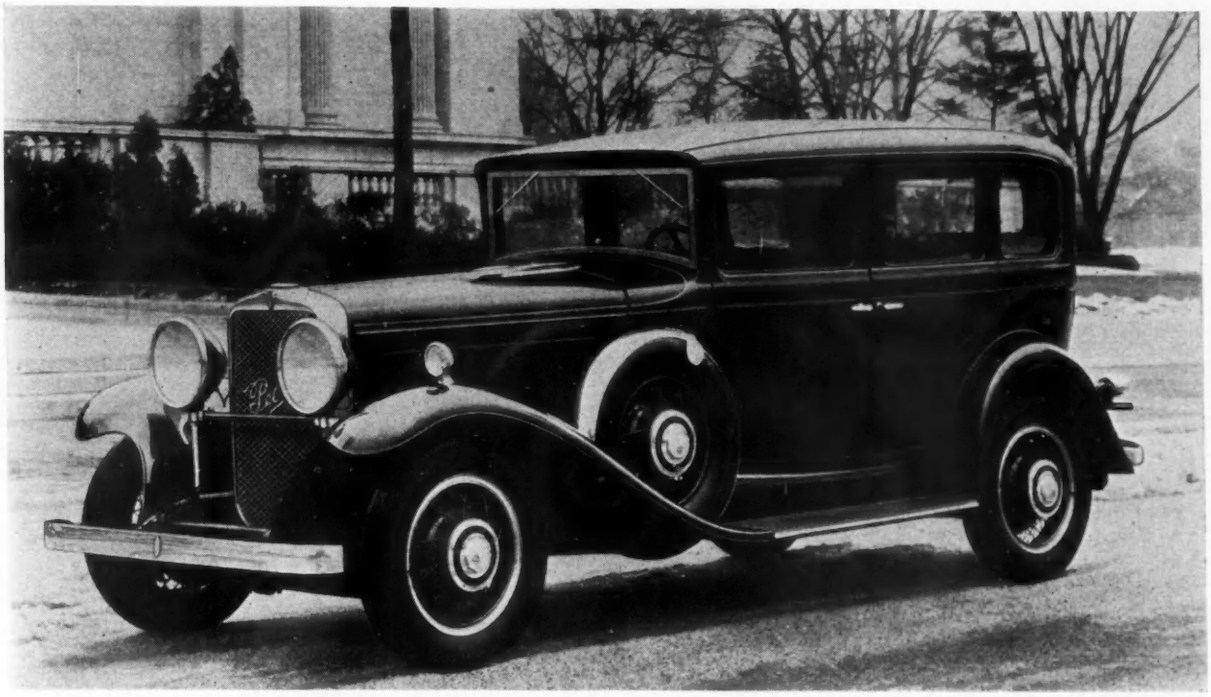
# De Luxe Master, With Six Body Styles, is Added to Peerless Line

PEERLESS MOTOR CAR CO. has supplemented its Master Eight series with a line of de luxe cars. The Master Eight series, it may be recalled, is Peerless' middle-sized series with 120 hp. straight eight engine of 120 hp. and a wheelbase of 125 in. These new cars have door hood louvers, a chromium-plated radiator shield, a script "Peerless" assembled in the center of the screen, a chromium-plated headlamp tie rod, a chromium-plated windshield frame, and a 4 in. single-bar front bumper. Metal tire covers are standard equipment on the de luxe models. The top shell of the tire cover is finished in chromium plating while the side wall cover is finished in colors to match the body of the car. A Peerless gold eagle emblem is found on each tire cover. All exposed metal parts of the running boards also are chromium-plated. The rear bumper is of the single-bar, full-width type.

New steering wheels of the three-spoked, thin-rimmed type are fitted. The center instrument panel has grained wood finish to match the garnish molding. The newly designed instrument controls, the cigar lighter on the instrument board, and the shift-lever are all in Catalin finish. An inside visor is furnished and is of such design that it may either be used as a transparent screen or tilted to such an angle as to be practically opaque. The standard equipment includes an extra windshield wiper for the right side of the windshield.

**The liberal use of chromium plating on radiator shell, headlamp tie rod, windshield frame, metal tire cover, bumper and exposed metal parts of the running board are conspicuous on the new models**

An option is given on two styles of broadcloth trim, and while on the subject of interior trim it is worth mentioning that a deep strip of carpeting is laid around the lower inside edge of the doors and side walls. Other minor features include a cloth-covered robe cord and assist straps, hassocks for the tonneau floor, and scuff plates of new design. The entire exterior of the bodies



**On the De Luxe Master models of the Peerless line tire covers with chromium-plated top shell are included as standard equipment in keeping with the free use of chromium-plate throughout the design + + + + + + + +**

is finished in one color, but a large variety of colors is offered for the customer to select from.

Some of the features of the de luxe Master line are embodied also in the Custom models, including the 4 in. single-bar bumper, the radiator screen, and the script Peerless.

Improvements have been made in the four-speed transmission that was introduced on the Custom and Master Eights last year. It is claimed that with these improvements the change from high to intermediate can be made with the car running as fast as 60 m.p.h. In third gear the car may be slowed down to 1 m.p.h. and then accelerated to 60 m.p.h. in less than 175 yd., according to the manufacturers. Torsional vibration is said to be materially lessened by the use of a new full-range torsion damper. A new type of aluminum-alloy piston is used in the Custom and Master engines, and a "hotter" type of spark has been adopted. The springs of all Peerless models are inclosed in metal spring covers.

Custom Eight body styles include a five-passenger sedan, a seven-passenger sedan, a seven-passenger limousine, a five-passenger club sedan, a five-passenger brougham (four-door), and a two-passenger coupe with rumble seat. The de luxe Master Eight body styles include a five-passenger sedan, a five-passenger club sedan, a five-passenger brougham (four-door), a two-passenger coupe with rumble seat, and a two-passenger cabriolet with rumble seat.

The Peerless Standard Eight will be continued as a companion car to the Custom Eight, the Master Eight and the de luxe Master with only minor improvements. This model, complete in five body styles, is listed at the factory at $1,495 for the five-passenger sedan; $1,495 for the two-passenger coupe; $1,545 for the five-passenger club sedan; $1,545 for the five-passenger brougham, and $1,595 for the two-passenger cabriolet. Prices of the de luxe Master line, with full equipment, are as follows: Five-passenger sedan, $2,320; coupe, $2,320; club sedan, $2,370; brougham, $2,370; cabriolet, $2,420.

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## British Speed Regulations May Popularize Heavy Oil Engines

ENGINEERING of London suggests that the new British speed regulations, which impose no limit on the speed of passenger cars with seating capacity for up to seven passengers, but limit the speed of commercial goods vehicles on pneumatic tires to 20 m.p.h. and of such vehicles on solid rubber tires to 16 m.p.h., may have the effect of stimulating the use of heavy oil engines for motor trucks. The reason for this expectation is that the fuel economy of a gasoline engine drops by about 30 per cent when the load on the engine is reduced from 100 to 40 per cent, whereas the fuel economy of a heavy oil engine under the same conditions decreases by only about 10 per cent, and if the speed of a vehicle is limited by regulation to a figure considerably below the maximum of which it is capable, the engine naturally will be comparatively lightly loaded.

The lapping machine of today is not a stock remover but an added refinement to the grinder for those who are striving for finer limits or better surfaces + + +

# Wear is

By Sydney Player

Norton Company

FOR years practically everything was finished by the use of the grinding machine. When we started to manufacture automobiles, so many of the parts had to be hardened and the distortion was so great that methods had to be discovered to keep pace with progress. The modern grinding machine was developed and improved rapidly until it became a fast stock remover and, up to the time of the advent of the mechanical lapping machine, was our best means of finishing hardened and in many cases soft parts commercially. Today we have machines for producing work to a finer finish and greater accuracy commercially. This operation is known to the trade as mechanical lapping, and machines have been developed and are now on the market and in operation in a great many plants all over the world.

Perhaps it would be interesting to take a modern automobile engine and see just how many of its parts are finished by this advanced operation and consider the advantages gained thereby. The bores in the cylinder block have to be made round and straight within close limits. After reaming, these bores are lapped or honed, using abrasive stones as the cutting medium. The bores in a cylinder block are finished in a very few minutes, and the resultant surface might be likened to the face of a mirror. As a result of the surface being smooth and the lines criss-crossed, no wear takes place for a very considerable period of time.

The crankshaft is first ground and is then taken to a modern lapping machine where all bearings and pins are lapped at one operation. In many instances the rate of production exceeds twenty shafts per hour. The resultant surface is smooth, and by the lapping action the lines on the periphery are criss-crossed and again, when assembled in crankcase, wear is negligible.

Piston pins are lapped also on a modern lapping machine after grinding. The pins being hardened and ground are then mechanically lapped in multiples about 40 pins to a load. Two types of machines are employed: one using cast-iron plates for the lapping and the other using abrasive wheels. The limits ordinarily held are plus or minus 0.0001 in. of size, and the finish is a mirror surface. Wear again is negligible and, according to tests conducted by engineers, a lapped surface is equivalent to a running in of approximately ten thousand miles.

For test purposes a foreign manufacturer of high-class automobiles carefully lapped as many parts of the engine as was practicable. All parts were carefully measured before assembling in the car, which was then run fifty thousand miles before disassembling. The parts that had been lapped were again measured and there was found no measurable difference.

Other industries that have benefited by the use of mechanical lapping machines include roller bearing, taper roller bearing manufacturers, etc. The modern gage factory has its installation of machines in use in the manufacture of plug gages, size blocks, etc. So while a comparatively new development on a commercial basis, the modern lapping machine of today has taken its place in the machine tool industry.

Lapping must not be confused with grinding. It is not a stock remover but an added refinement which has

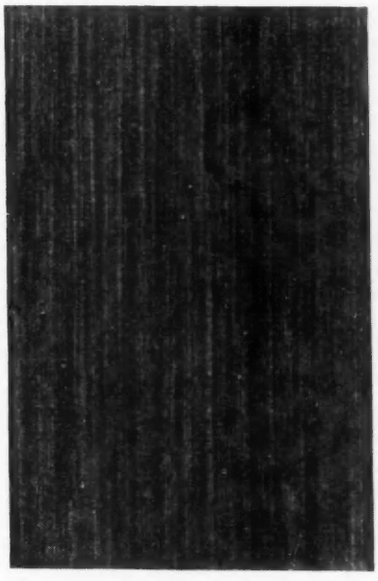
# Reduced by Machine Lapped Parts

proved necessary in industry today, as everyone in the manufacturing world is striving for finer limits and better surface finish.

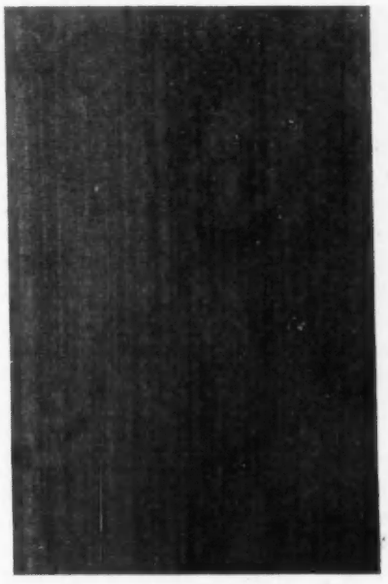
It would perhaps be interesting to give some comparative costs on the operation. The machines for this operation on the market at the present time have been designed for simplicity; in fact they are so simple it is an unskilled operation to run them. Lapping a quantity of pieces at once, in the case of piston pins 1 in. dia. 3 in. long, 40 pins are lapped at once. The average production on this pin on machines using cast-iron plates as laps would be around 100 pins per hour. Using machines equipped with abrasive wheels the production would be around 500 pins per hour. Stock removal the same on both machines—approximately 0.0002 in. to limits of plus or minus 0.0001 in.

A machine lapped surface coming in contact with another moving part reduces friction to a minimum. It provides a more thorough and uniformly efficient distribution of the oil film surrounding it. Consequently, machine-lapped working parts, particularly those under great stress, will wear longer without reduction in size, and there will be less risk of seizure, less slack, less noise and longer life. When machine lapped parts are used in mass construction it is seldom necessary to have selective assembly. Machine lapping eliminates all or a great deal of the selection of parts and its corresponding loss of production time.

The surface finish of a mechanically lapped piece must not be confused with centerless lapping, so-called, or mirror-finish grinding. No doubt a high polish can be obtained by the use of suitable wheels, and perhaps to the naked eye it looks as good a finish as a true lapped surface. However, upon close examination it will be found that even the best grinding has the typical grain and feed marks which can usually be felt with the finger-nail or the teeth. The feed lines run around the periphery and show up similar to a fine



The ordinary finish produced by centerless grinding preparatory to lapping or polishing + +



The same surface after a special finishing operation in a centerless grinding machine + +

Still the same surface after a rough lapping operation with a comparatively coarse abrasive

After lapping with the coarse abrasive the operation is repeated with a fine grit abrasive

pitch screw thread. Take, for example, a finely ground plug gage. Wear will quickly show, and after plugging a number of holes one can find, on examination, that the surface is made up of a large number of high spots which quickly wear down with use. Because the ground surface is composed of these high and low spots, a certain amount of foreign matter is always carried into the hole when plug gage is used, and the foreign matter contributes largely to the rapid wear of the ground plug gage. The hand-lapped plug gage, while having much longer life, still falls far short of the machine-lapped plug gage in durability due to the fact that the finish is seldom as good, nor the accuracy so uniform.

The machine lapped surface shows, on inspection, lines which run criss-crossed. Therefore, the surface is what we know as a matt surface, which is without grain or definite pattern. Accuracy can be much more easily held and perfect surface obtained.

However, machine lapping will not put bad grinding right. The better and closer the preliminary grinding operations are performed, the quicker and easier the lapped surface is obtained.

# Twenty-one States Require Drivers' Licenses

TWENTY-ONE states and the District of Columbia require licenses for those operating motor vehicles on their highways, according to a digest of the state laws recently completed by the Motor Vehicle Conference Committee. Of these twenty-one states and district, seventeen require an examination for the granting of licenses. Of these seventeen, twelve include a road test with the examination. In four of the states requiring operator's license the examination, together with the road test, are optional with the licensing authority.

Thirty-eight states and the District of Columbia require license for chauffeurs or those operating motor vehicles for hire. Of these, nineteen require examinations and thirteen demand a road test with the examination. In six states the examination of an applicant for chauffeur's license is optional with the licensing authority and road tests in all optional cases may or may not be required, as the licensing authority sees fit.

In all but eleven of the states, minimum age limits are set for operators of motor vehicles, and in all but seven minimum age is set for chauffeurs. The highest minimum age for operators is in New York, where a person must be eighteen years old before securing an operator's license. This state, among others, does make provision for junior operator's license, entitling the holder to operate under certain conditions and for certain purposes. The minimum age for junior license in New York is sixteen. New Jersey has a minimum age for both operators and chauffeurs of seventeen.

There are twenty states giving sixteen as the minimum age for operators. Ten have a minimum age of fifteen, five have a minimum age of fourteen and one with a minimum age of twelve. For chauffeur's license, twenty states require a minimum age of eighteen; New Jersey seventeen. Eleven require a minimum age of sixteen, seven a minimum age of fifteen, two a minimum age of fourteen and one a minimum age of twelve.

In a number of instances certain special requirements are laid down for securing licenses under certain circumstances. Seven states, for example, have special requirements for those operating school buses. In nine states signatures of parents or guardians or other responsible persons are necessary for persons under a given age to operate vehicles either for their own use or as hired chauffeurs. In seven states provision is made for people under such ages to operate when accompanied by a parent, licensed operator or the owner of the vehicle.

In Arkansas, where chauffeur's license is required, an exception is made in the case of one who operates a truck used only for delivering farm products to market for the owner of the truck, who produces such products, and for the hauling of farm supplies.

Most of the states waive examination for persons applying for renewal licenses.

In Rhode Island, where both operator's and chauffeur's licenses are required, any person under sixteen years of age may operate a motor vehicle under the supervision of a licensed operator, such licensed operator to be personally liable for any violation of the motor vehicle laws.

In Florida, persons under the age of fourteen are permitted to drive when accompanied by a licensed chauffeur or the owner of the vehicle being operated. Florida does not require an operator's license but does require a chauffeur's license. A similar law obtains in Illinois, except that the minimum age for drivers operating alone is fifteen instead of fourteen.

Maryland, which requires both operator's and chauffeur's licenses, grants the commissioner discretionary powers to license persons between fourteen and sixteen to operate bicycles with motor attachments.

New Mexico, which requires no license but has a minimum age for operators and chauffeurs of fourteen, has a law permitting persons under fourteen to operate motor vehicles upon obtaining a certificate from the state comptroller that he is competent to do so.

Junior operator's license is issued in New York to persons between the ages of sixteen and eighteen and entitles the holder to operate a motor vehicle to and from school and in the usual and ordinary pursuit of business of such licensee's parent or guardian. Such license does not entitle the operator to drive in a city exceeding 1,000,000.

# Books for the Business Bookshelf

## The Involute Gear Simply Explained

Fifth Edition. Published by the Fellows Gear Shaper Co., Springfield, Vt.

THIS booklet explains in simple language and with the aid of suitable illustrations the application of the involute curve to toothed gearing, methods of tracing the curve, the advantages of the involute form for gear teeth, such gear elements as pitch diameters, pressure angles, and such problems in gear design as interference of teeth, overlap of tooth action, slippage of teeth upon each other, and relation of pressure angle to interchangeability and bearing loads. Considerable information is given on the method of generating involute gear teeth, and the final chapter contains definitions and proportions of gear tooth elements, rules and formulas for calculating dimensions of diametral-pitch gears and conversion tables.

## New Departure Ball Bearings

New Departure Ball Bearings—Dimensions, Load Data and Price Lists. Published by the New Departure Manufacturing Company, Bristol, Conn.

THIS is the seventh edition of the New Departure Co.'s publication on this subject. A rather handy arrangement of the material has been adopted in that the first page inside the cover is an index page which contains for each type of bearing manufactured by the company, a sectional drawing, the name, the type number and a brief description explaining the purposes for which the type is generally used. From this index page the reader passes to the page devoted to the particular type which gives the dimensions of all sizes made of that type. One section of the book is devoted to rules for the determination of bearing sizes, and tables of tolerances and fits for bearing mountings are also given.

## Techno-Diktionaer

By Hubert Hermanns. Published by the author. Berlin-Lichterfelde, Germany.

THIS is the second edition of a pocket dictionary of technical terms in German, English and Italian. It is divided into three sections, in each of which the words are arranged alphabetically in one of the three languages. The book is intended as an aid in reading technical publications in foreign languages and should serve that purpose very well. In compiling it the author has had the assistance of both an English and an Italian associate and the book seems to be exceptionally free from a common fault of technical dictionaries of giving—in many cases—literal translations of technical terms instead of their actual equivalents.

## Budgeting Manufacturing Operations

By Policyholders Service Bureau, Metropolitan Life Insurance Company.

THE budgeting practices of more than 80 representative manufacturing concerns are analyzed and presented in an interesting form in this volume. This report reviews in detail some of the noteworthy features of budget practices and some of the important aspects of these, such as production schedules, material, labor and manufacturing expense budgets, comparison of actual and budgeted accomplishment, and incentive systems for securing the latter.

A limited number of copies of this report is available and may be obtained by addressing the Policyholders Service Bureau at One Madison Ave., New York City.

## Tool Engineering

O. B. Jones, President, Detroit School of Applied Science.

THIS book is Part 2 in a series of texts developed by the author for teaching the fundamentals of production engineering at the Detroit School of Applied Science, Inc., of which he is president.

In form, this book is a loose-leaf manual, containing detailed information on the designing of tools, gages and fixtures for various typical automotive parts. The text matter is given in simple and intensely practical form, and we are told it has been adopted by the General Motors Institute of Technology in their general engineering course.

## Nickel Alloy Steel Forgings

Technical Bulletin No. 17. The International Nickel Co., New York.

THIS is a reprint of a paper presented before the American Society for Steel Treating, Semi-Annual Meeting, New York, Feb. 7, 1930, by Charles McKnight, Development and Research Dept., International Nickel Company, Inc. It deals with the manufacture, uses, analyses, heat treatment and properties of Nickel Alloy Steel Forgings over 4 in. in diameter or the equivalent.

## Diesel Power Plant Handbook

Sixth edition, by Julius Kuttner. Published by Diesel Power, New York, N. Y.

THIS handbook, which was formerly known as Oil Engine Power Plant Handbook, consists of two parts, a general treatise on Diesel engines in which the different parts are taken up in succession and their functions described, and in which other information of use to the Diesel engine operator is also given; and a catalog section in which the different makes of Diesel engine on the American market are illustrated and briefly described. While the emphasis is on the heavy stationary powerplants, information is given also on some of the high-speed oil engines produced in recent years, particularly on their fuel injection pumps and spray nozzles.

# Auxiliary Wing Stabilizes Focke-Wulf


This front view shows the auxiliary wing and the forward supporting wheel + + + + + + + + +

by
Edwin P. A. Heinze

ALTHOUGH the first duck-type plane ever built crashed on its home field at Bremen, Germany, in September, 1927, and killed its pilot, Wulf, one of the two chiefs of its builders, the Focke-Wulf Airplane Co., the German Aeronautical Research Institute (Deutsche Versuchsanstalt fur Luftfahrt) gave an order for the construction of a new machine of that type, which was delivered a short time ago. A thorough investigation and further researches on the principles involved, especially by Professor Hopf, led to the conclusion that the regrettable accident was not due to any defects inherent in the basic principle of the type, and this, together with the fact that its own experts had always thought well of the principle, induced the Institute to place the order.

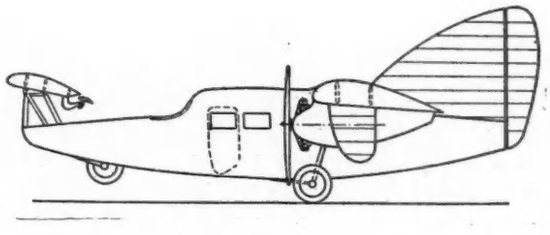
Among the advantages claimed for the duck type of plane the following may be mentioned: It cannot turn over on its nose when landing on rough ground, owing to the forward supporting wheel being located far forward of the center of gravity, immediately in front of the leading edge of the main wing. This also permits of full application of the brakes if necessary, thereby considerably reducing the space in which the plane can be landed with safety.

Further it is impossible to get the machine to spin, and it cannot be stalled under any circumstances. This is due to the fact that the small auxiliary wing has a much larger angle of incidence than the main wing, hence it reaches the stalling angle much earlier than the main wing, which simply means that the auxiliary wing cannot ride further and increase the angle of attack of the plane as a whole. Hence the main wing can never attain the stalling angle. At normal flying angles the effect of the elevator attached to the auxiliary wing is so great that it at first seriously embarrassed the designers, whereas in the case of conventional planes it is usually quite difficult to obtain sufficient elevator effect and impossible to reduce the effect to naught the moment the stalling angle is reached.

A higher degree of propeller efficiency is claimed, particularly for two-engined planes of the duck type, since the propellers may be located at the trailing edge, where the blast from them is not interfered with by any part of the machine. This possibility was not taken advantage of in this present machine because it was not considered advisable to experiment with long propeller shafts. Finally, increased safety is claimed for the location of the passengers so far back as in the case of the machine here illustrated.

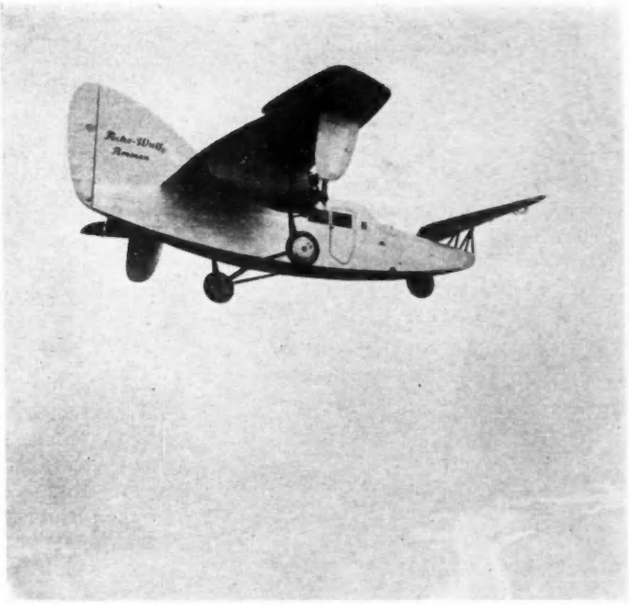
The latest Focke-Wulf duck has passed its type test in Germany and is approved for use in public transportation services. It has a fuselage comprised of a steel-tube frame covered with fabric, which is slightly over 34 ft. long. The main wing, which has a span of 46 ft., is of wood and fabric construction. It has a lifting area of 317 sq. ft. and is attached to the fuselage at a recess in its upper surface about 12 ft. from the tail end.

To the left and right of the fuselage are the streamlined engine nacelles, in the forward part of each of which is mounted a 100 hp. Siemens & Halske radial engine. Behind the fire wall of the engine compart-



The fuselage is comprised of a steel tube frame covered with fabric + + +

# Plane



The auxiliary front wing and the vertical fins are said to constitute an insurance against spinning + +

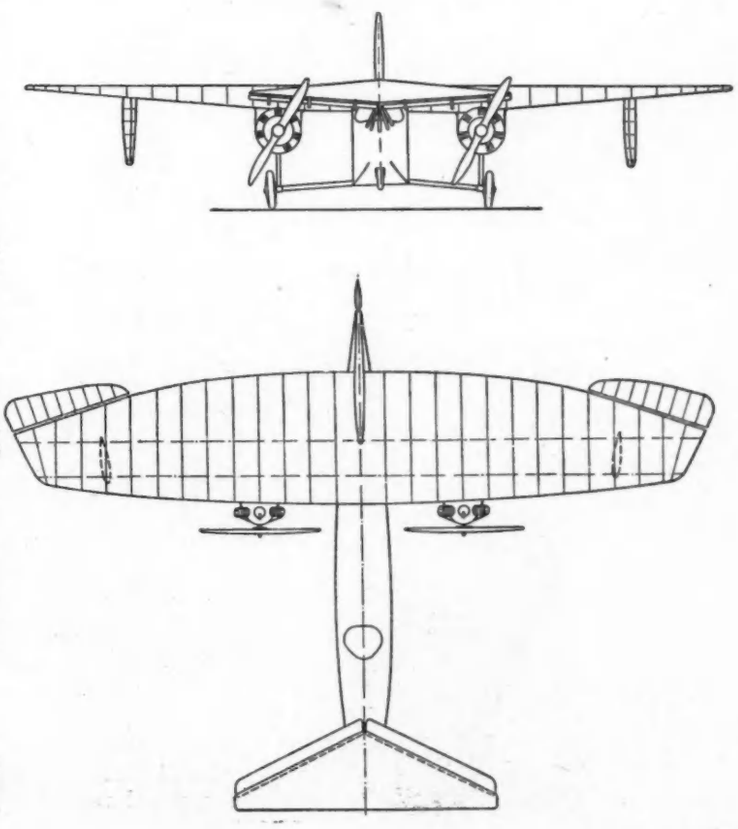
ment are located the rubber-disk shock absorbers of the landing-gear struts. The wheels are mounted on divided axles pivoted to the bottom of the fuselage, and the machine is supported on them through the struts already referred to.

Near each wing tip there is a fixed vertical fin, with bracing wires on both sides. In the fuselage immediately forward of the leading edge of the main wing there is a cabin for three passengers. Directly in front of the cabin the height of the fuselage is considerably reduced, and at this point is located an open cockpit for the pilot, who enters it by way of steps provided in the side of the fuselage. In front of the blunt nose of the fuselage is located the auxiliary wing, which has a deep section and is mounted on struts. It has a span of 16.4 ft. and a lifting area of 64.6 sq. ft.

Originally it was intended to make provision for a see-saw movement of this wing, to be controlled by the pilot, for use in the event of failure of one of the engines. But the fatal accident to Wulf was ascribed to such a movement of the wing, the effects of which had not been sufficiently studied. In the present plane, therefore, the wing is firmly fixed on each side by two cables leading down to the fuselage.

The tips of the front wing are connected by cables with those of the main wing, to relieve the wing mounting on the struts of torsional stresses in a horizontal plane. The rudder fin is exceptionally large, extending from the tail to almost half way up the main wing. That there were difficulties in the way of keeping the machine's nose in the direction of intended flight is also indicated by the large fins under the main wing. The rudder itself is comparatively narrow, but very high. All control surfaces are operated by wire cables running over pulleys.

Recessed into the lower surface of the fuselage just behind the front wing is a third wheel. The fuel tanks are located in the nose of the main wing to both sides of the fuselage. The entire machine, ready for flight, weighs 2585 lb.; it is capable of carrying 1045 lb., making the total flying weight 3630 lb. The maximum speed is 88.5 m.p.h., the cruising speed 78 m.p.h. and the landing speed 51.5 m.p.h. In flight the machine is said to have proved itself easy to maneuver and to have shown good climbing qualities.

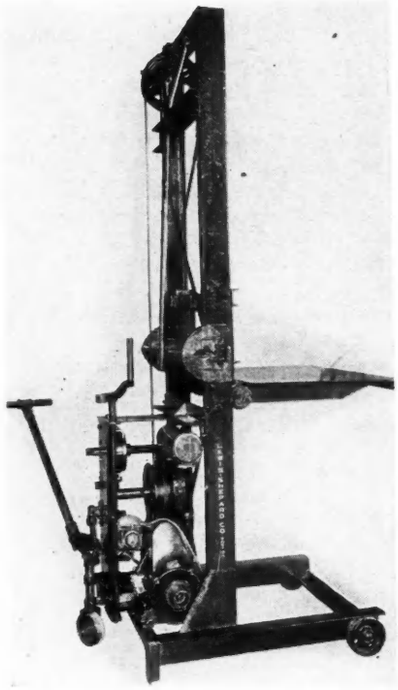


The Focke-Wulf plane is 34 ft. long, the span of the main wing is 46 ft. It is powered by Siemens & Halske radial engines + +

# NEW DEVELOPMENTS—AUTOMOTIVE

## Power Stacker

THE Lewis-Shepard Co., Boston, Mass., has added a combination gas engine driven and hand-power stacker to its line of lifting equipment. This machine is operated by a compact 2½ to 3 hp. air-cooled four-cycle engine and will lift a 1000-lb. load at the rate of 40 ft. per min. Lowering the load is taken care of by means of



a decelerator control which prevents undue speed. The stacker is of special value in providing suitable means of tiering and storing material so that floor space is saved and handling eliminated. The gasoline motor removes restrictions imposed by electric lines.

## Burgess Intake Silencer

AN intake silencer for application to the air inlets of automobile carburetors is now being marketed by the Burgess Battery Co. of Madison, Wis. The principle of this silencer is similar to that of the Burgess exhaust muffler, the silencer consisting of a tube with perforated walls, which is surrounded with sound-absorbing material inclosed in a metal casing.

The sound-absorbing material used in the silencer is known as Balsam wool, which is made from lumber-mill by-products. An advantage of this type of intake silencer is that the flow of air through it is not restricted in any way.

## Defco Drop Forged Conveyor Chain

MANY new features, some of which are given below, are incorporated in the drop-forged conveyor chain now being made and sold by the Detroit Forging Co., Detroit, Mich. Among these are the milled bearings of the center links, the broached bearings of the side links and accurately coined pins.

Accuracy in design and manufacture are said to assure in complete interchangeability with other chains now in use. This chain is made in all standard sizes with a complete line of chain attachments for each size. Production on this chain is now at the point where immediate shipments are possible. The complete line of Defco Chain and attachments is fully described and illustrated in a new catalog, sent free upon request.

## Pangborn Rubber Sand-Blast Helmet

THE Pangborn Corp., Hagerstown, Md., announces an entirely new all-rubber sand-blast helmet, Type "DE." This helmet introduces improved features at low cost. It protects the wearer's eyes, flesh and lungs and can be repaired as

# PARTS, ACCESSORIES AND PRODUCTION TOOLS

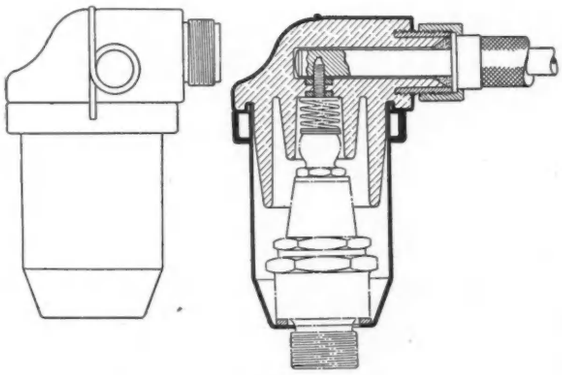
simply as patching a tire tube. It has been tested under actual Sand Blast conditions.

The helmet is equipped with a curved window giving true vision, protected by a bulged screen. Both glass and screen are easily replaceable. Piped into the back of the helmet, at any desired pressure, fresh air is kept circulating for breathing, and a fixed jet above the soft, special sweat band cools the head. Through holes above it, air sprayed onto the outside of the visor keeps dust from fogging the visor window.

Another feature applicable to this helmet is the Pangborn Type "B" Air Washer which supplies the operator with clean water-washed air practically at atmospheric pressure.

## Breeze Spark Plug Shield

RADIO shielding equipment for the ignition system of aircraft engines is manufactured by Breeze Corp., Newark, N. J. An illustration of the spark-plug shield of this firm is reproduced herewith. The company points out that mere



shielding of the high-tension wires from the magneto to the spark plugs is not sufficient; the spark plugs themselves and the auxiliary hook-ups must also be shielded in order to prevent interference with radio reception. Breeze radio shielding is claimed to be moisture-proof.

## G. E. Reversing Motors

THE General Electric Co., Schenectady, N. Y., announces a new line of single-phase, repulsion induction motors, designated type SCA, capable of frequent reversal. These motors have the same appearance as the General Electric type SCR general-purpose, single-phase motors, and are mechanically interchangeable in all respects with corresponding horsepower and speed ratings of that type.

Available ratings range from ¾ to 5 hp. at 1800 r.p.m., and from ½ to 2 hp. at 1200 r.p.m. The starting torque is high and ranges from 225 to 275 per cent of normal full-load running torque depending on the rating.

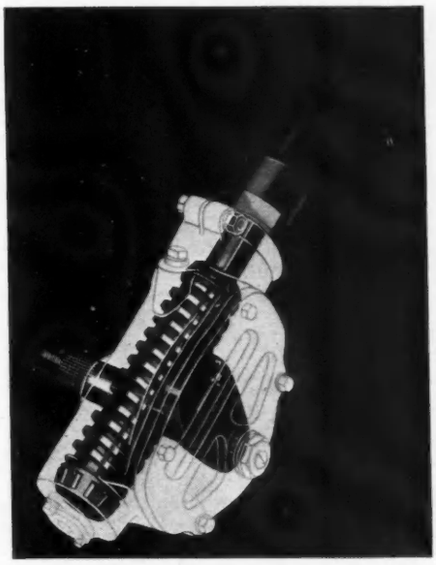
## New Hannum Steering Gear

A NEW nut-and-lever-type steering gear announced by Hannum Manufacturing Co., Milwaukee, Wis., has been designed to combine ease of operation with low maintenance cost. The quarter-nut design, in which from four to five threads of the nut are in contact with worm threads at all times, and the principle of increased mechanical advantage in the extreme positions, have been retained from former Hannum practice. The worm is now fitted to the worm tube by serrations and is supported in Timken roller bearings to facilitate operation.

The trunnion is a closed-end member, with a slot into which the trunnion block engages, the latter in turn fitting over the sliding-nut pin. As the wheel is turned from the mid-position, the mechanical advantage gradually increases, until in the extreme position, where resistance to steering is greatest because of the effects of caster and camber, the greatest power is available. Combined with the greatest mechanical advantage at the ends is the fastest steering action at the middle.

The pressure side of the worm thread is ground. Lubricant is pumped to the bearing surfaces automatically by the action of the sliding nut and trunnion. To permit the oil to flow freely to the outer trunnion bearing, a groove is provided in the housing casting, through which the oil flows to a chamber between the inner and outer trunnion bushings. Therefore, as long as the housing is at least half-filled, oil will get out to the outer trunnion bushing.

Adjustment for wear between the threads and at the trunnion cheek can be made by means of a "side adjustment." Up-and-down play and play in the Timken bearings is taken care of by a large adjusting screw at the top of the housing, which is firmly clamped in position by a split section of the upper part of the steering-gear housing proper.

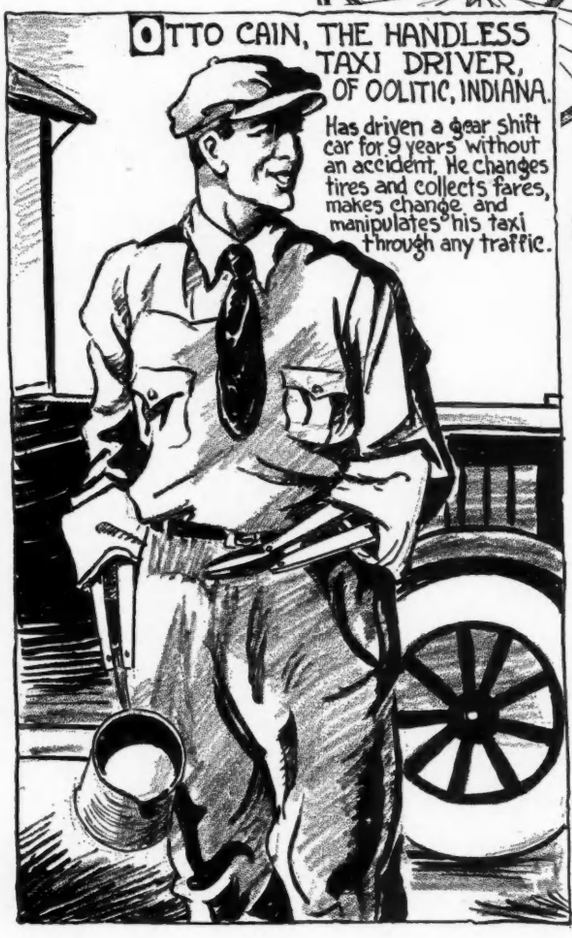


# Automotive Oddities—By Pete Keenan

ABOUT 30 YEARS AGO WORD COINERS WERE COMPETING FOR A NAME FOR THE HORSELESS CARRIAGE WITH:

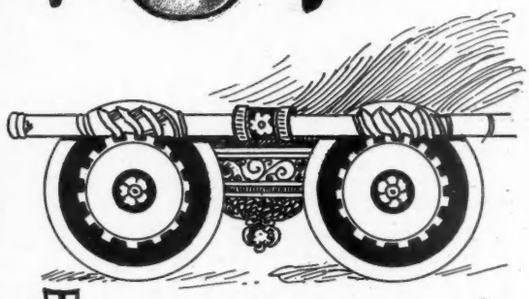
**AUTOMOTOR**
**MOTORWAGON**
**MOTOCYCLE**
**PETROCAR**

CLARENCE SIMONDS MADE QUITE A HIT WITH THIS STEAMER IN 1893. BUT, AS MR SIMONDS SAID, "IT WAS NOT SO HOT WHEN THE WIND WAS COMING FROM BEHIND".
Lynn, Mass.



OTTO CAIN, THE HANDLESS TAXI DRIVER, OF OOLITIC, INDIANA.
Has driven a gear shift car for 9 years without an accident. He changes tires and collects fares, makes change and manipulates his taxi through any traffic.

AMELIA EARHART
THE FIRST WOMAN TO FLY THE ATLANTIC
BROKE THREE WORLD SPEED RECORDS FOR WOMEN IN ONE DAY.



HOW OLD IS THE WORM GEAR?
THIS WAS DRAWN FROM A 16th CENTURY PRINT.

# NEWS OF THE INDUSTRY

## Chevrolet Begins Truck Body Plan

### Will Assemble Standardized Types at 52 Distribution Points

DETROIT, Dec. 18—The plan of the Chevrolet Motor Car Co. to provide its dealers with standardized bodies at low cost through mass production has been rapidly progressing since the acquisition of the Martin-Parry Co. in Indianapolis. All operations are centralized in Indianapolis, where the factory, according to the latest available figures, employs 665 men.

Personnel of the body division includes J. A. Jamieson, general manager; F. E. Evans, general sales manager; A. R. Cosgrove, assistant general manager; H. H. Howard, factory manager; F. R. Fraser, divisional comptroller. The company is rapidly opening branches under the control of the Indianapolis headquarters at the 52 points in the United States where zone offices are located.

The personnel of these branches as affecting body operations will be limited to a salesman, a foreman and a few hourly rate men who will be hired locally from time to time. The function of these branches in addition to stocking body type for supply to dealers in this territory will be merely to mount bodies purchased from the branch or crate shipments from the branch out of the location. Bodies are to be sold f.o.b. Indianapolis to dealers and it is expected that approximately 25 to 30 body styles will be made available.

Production at the Indianapolis plant at present is at a rate somewhat in excess of 100 bodies per day. Truck chassis will not be shipped complete with bodies to dealers and no restriction is being placed on dealers regarding purchase of bodies from other sources. While actual body prices are not as yet available, it is expected

*(Continued on page 919)*

## Ford Plant Closed

DETROIT, Dec. 18—The Dearborn plants of the Ford Motor Co. closed today for inventory. According to present plans they will begin production again Jan. 5.

## The News Trailer

By Herbert Hosking

Irvin S. Cobb will **coruscate** and Robert L. **Ripley** will **reiterate** at the N.A.C.C. banquet during show week . . . expectant moth-ers and chronic skeptics are promised pabulum * * * Knute **Rockne** will be introduced by **toastmaster-engineer Kettering** at the S.A.E. annual banquet * * * terrible, bad, poor, and fair . . . describes first four quarters of 1931, says Col. Ayres * * * hotel reservations for New York Show in advance of last year, say hotelmen * * * speaking over WOR, Bamberadio station in Newark, during show week will be E. V. **Rickenbacker**, A. J. **Brosseau**, George **Bauer** of the N.A.C.C., Jim **Spearing**, oughtomobile editor of the N.Y.T., and Ray **Sherman**, editor of MoToR * * * Robert G. **Woodruff** is glad that he is no longer president of the **White** Co. . . . because "I can spend less of my life on **Pullman** cars" * * * 2500 of the homeless unemployed in Detroit are being housed in a Fisher body plant lent to the city * * * Colin **Macbeth**, international tire authority, thinks the U. S. Rubber Co. has done a good job in centralizing their manufacturing in **Detroit** * * * **C. W. Nash** thinks business is emerging from depression "**purged** and fortified" * * * **Ford** has bought the Walpole Iron mine property of 300 acres at Iron Mountain, Mich. * * * E. E. **Aldrin**, aviation manager of **Standard** Oil of N. J., will be proxied at the Paris Aero Safety Conference by M. Gordon of **L'economique**, presenting paper: Safe Handling of Aircraft Fuel * * * H. T. Thomas, Reo's researcher, is back from the Paris Salon . . . Fabio Sergardi, Royale designer, couldn't go, but his new Royale got a big hand * * * Amelia **Earheart** is the first woman to pilot an **Autogiro** * * * 1932 will be the best **dealer** year in history, thinks **Blees** of Oakland * * * **Illinois** license tags may have to advertise **Chicago World's Fair**, if bill to be introduced in **Illinois** legislature is passed * * * "**Permite**" will be tradename of all **Aluminum** Industries' products * * * the jungle is creeping in on the **Ford** rubber plantation in **Brazil** * * * Two more **plants** are back on the five-day **week**. Cheers.

## Discuss Uniform Aeronautic Laws

### Delegates From all States Seek Conformity to Federal Code

WASHINGTON, Dec. 18—Delegates from the 48 states yesterday closed a two-day conference to discuss uniform aeronautic regulatory laws. The conference was called by Robert P. Lamont, Secretary of Commerce, and was designed to further the enactment of state aeronautic laws modeled closely on the Federal regulations.

Discussion at the conference centered around papers by Clarence M. Young, assistant Secretary of Commerce for Aeronautics; Col. Charles A. Lindbergh; Capt. Frank M. Hawks; L. D. Seymour, vice-president and general manager of National Air Transport; George B. Logan, member of the American Bar Association's committee on aeronautics; Clarence M. Knox, commissioner of aviation in Connecticut, and John M. Vorys, director of the Ohio State bureau of aeronautics, and other figures prominent in the operations field of aeronautics.

The delegates and observers at the conference enthusiastically concurred in a suggestion that a telegram be sent to Orville Wright, at Dayton, Ohio, congratulating him on the twenty-seventh anniversary of the first successful flight of a heavier-than-air machine.

## Methanol Judged Safe

WASHINGTON, Dec. 16—Observations made by the Bureau of Mines have indicated that there is no danger of poisoning from the reasonable use of methanol as an anti-freeze for automobile radiators. The evidence that methanol poisoning has been caused by absorption through the skin is rare and inconclusive, according to the report of the Bureau. The investigation of the use of methanol was made at the request of the chemical concerns interested in the marketing of it.

## Dr. E. G. Davis Dies

CHICAGO, Dec. 18—Dr. Edgar George Davis, medical director of the Bendix Brake Co., died yesterday at South Bend, Ind. He was 56 years old.

# Motor Vehicle and Trailer Output

WASHINGTON, Dec. 17—The Bureau of the Census announces that, according to a preliminary tabulation of the data collected in the Census of Manufactures taken in 1930, the total value of motor vehicles and trailers shipped or delivered in 1929 by establishments in the United States engaged primarily in the manufacture of these vehicles amounted to $3,415,636,810 (at f.o.b. factory prices), an increase of 34.1 per cent as compared with $2,546,807,058 reported for 1927, the last preceding census year. The total for 1929 is made up as follows: 4,432,242 passenger vehicles, including chassis, valued at $2,793,166,812; 26,004 public conveyances, $58,127,237; 1910 government vehicles (Federal, state, county, and municipal), etc., $9,875,467; 827,318 commercial vehicles, $544,415,348; 21,055 trailers, $10,051,946.

The passenger vehicles reported for 1929 comprised 3,911,547 closed cars, valued at $2,530,714,089; 444,686 open cars, $230,275,298; 76,009 chassis, $32,177,425. The figures for closed cars represent increases of 62.4 per cent and 31.9 per cent, respectively, as compared with 2,408,148, valued at $1,918,157,677 reported for 1927; and those for open cars represent increases of 8.7 per cent and four-tenths of one per cent, respectively, as compared with 409,158, valued at $229,405,033, reported for 1927. In addition, the value of parts and accessories, etc., reported by these establishments amounted to $302,359,743, making an aggregate of $3,717,996,553.

The foregoing figures and the other statistics herewith relate to manufacturers whose principal products are complete motor vehicles or trailers, and do not include data for the production of establishments engaged primarily in the manufacture of bodies, parts, and accessories for motor vehicles.

For census purposes an assembling plant (a plant in which parts made in another plant under the same management are assembled into complete motor vehicles) is treated as a manufacturing establishment. This is necessary in order that each state and city may be credited with its due share of the motor-vehicle industry. As a result, the number of *establishments* shown, 242, is much in excess of the actual number of *manufacturers*. The number of such manufacturers reporting at the census for 1929 (counting the General Motors organization as 6) was 187, including 31 manufacturers of trailers. These figures are appreciably lower than those for 1927, namely, 209 manufacturers (General Motors counting as 7), including 33 manufacturers of trailers.

The statistics for 1929 and 1927 are summarized in Table 1, and detailed production statistics are given in Tables 2 and 3. The 1929 figures are preliminary and subject to revision.

### Summary for the Industry: 1929 and 1927

| | 1929 | 1927 | Per cent of increase or decrease (—) |
|---|---|---|---|
| Number of establishments | 242 | 264 | —8.3 |
| Wage earners (average for the year) [1] | 225,583 | 187,910 | 20.0 |
| Wages [2] | $365,660,895 | $321,664,093 | 13.7 |
| Cost of materials, fuel, and purchased electric current [2, 3] | 2,398,318,091 | 1,889,426,249 | (3) |
| Products, total value [2] | 3,717,996,553 | 2,848,442,843 | 30.5 |
| Motor vehicles & trailers | 3,415,636,810 | 2,546,807,058 | 34.1 |
| Other products | 302,359,743 | 301,635,785 | 0.2 |
| Value added by manufacture [4] | 1,319,678,462 | 959,016,594 | (4) |

[1] Not including salaried employees. The average number of wage earners is based on the numbers reported for the several months of the year. This average somewhat exceeds the number that would have been required for the work performed if all had been continuously employed throughout the year, because of the fact that manufacturers report the number employed on or about the 15th day of each month, as shown by the payrolls, usually taking no account of the possibility that some or all of the wage earners may have been on part time or for some other reason may not actually have worked the entire month. Thus in some cases the number reported for a given month exceeds the average for that month.

[2] Manufacturers' profits can not be calculated from the census figures because no data are collected for certain expense items, such as interest on investment, rent, depreciation, taxes, insurance, and advertising.

[3] The cost-of-materials item for 1927 is not strictly comparable with the corresponding item for 1929 because of the fact that the schedule for 1927 provided for the inclusion of data on the cost of shop supplies, whereas that for 1929 stated that such data should not be included. For this reason no per cent of increase is presented.

[4] Value of products less cost of materials, fuel, and purchased electric current. The figure for 1927 is not strictly comparable with that for 1929 because of the change in the cost-of-materials item. (See footnote 3).

### Motor Vehicles and Trailers—Production, by Type, Number and Value: 1929 and 1927

| | 1929 | 1927 | Per cent of increase or decrease (—) |
|---|---|---|---|
| Motor vehicles and trailers made in all industries, total value [1] | $3,415,636,810 | $2,547,926,285 | 34.1 |
| Made in the motor-vehicle industry, value | $3,415,636,810 | $2,546,807,058 | 34.1 |
| Made as secondary products in other industries, value | (2) | $1,119,227 | .... |
| Passenger vehicles (not including public conveyances): | | | |
| Total number | 4,432,242 | 2,873,380 | 54.3 |
| Total value | $2,793,166,812 | $2,174,718,977 | 28.4 |
| Closed— | | | |
| Total number | 3,911,547 | 2,408,148 | 62.4 |
| Total value | $2,530,714,089 | $1,918,157,677 | 31.9 |
| Coupes (including convertibles)— | | | |
| Number | 944,205 | 465,157 | 103.0 |
| Value | $565,951,824 | $353,165,131 | 60.3 |
| 2-dr. sedans and coaches: | | | |
| Number | 1,260,481 | | |
| Value | 619,799,029 | | |
| 4-dr. sedans— | | | |
| Number | 1,630,714 | 1,942,991 | 52.7 |
| Value | $1,273,345,299 | $1,564,992,546 | 25.5 |
| Other closed (landaus, broughams, etc.)— | | | |
| Number | 76,147 | | |
| Value | $71,617,937 | | |
| Open— | | | |
| Total number | 444,686 | 409,158 | 8.7 |
| Total value | $230,275,298 | $229,405,033 | 0.4 |
| Roadsters and runabouts— | | | |
| Number | 298,947 | 197,880 | 51.1 |
| Value | $152,841,101 | $116,099,471 | 31.6 |
| Other — | | | |
| Number | 145,739 | 211,278 | —31.0 |
| Value | $77,434,197 | $113,305,562 | —31.7 |
| Chassis— | | | |
| Number | 76,009 | 56,074 | 35.6 |
| Value | $32,177,425 | $27,156,267 | 18.5 |
| Public conveyances: | | | |
| Total number | 26,004 | 8,698 | 199.0 |
| Total value | $58,127,237 | $27,982,060 | 107.7 |
| Motor buses (school, sight-seeing and public-utility)— | | | |
| Under 21 passengers— | | | |
| Number | 5,646 | (3) | .... |
| Value | $7,495,042 | (3) | .... |
| 21 to 32 passengers— | | | |
| Number | 2,229 | (3) | .... |
| Value | $13,296,016 | (3) | .... |
| 33 passengers and over— | | | |
| Number | 1,101 | (3) | .... |
| Value | $10,587,618 | (3) | .... |

# Valued at $3,415,636,810 for 1929

| | 1929 | 1927 | Per cent of increase or decrease (—) |
|---|---|---|---|
| Taxicabs— | | | |
| Number | 17,028 | (3) | .... |
| Value | $26,748,561 | (3) | .... |
| Government (Federal, state, county, and municipal), etc. (fire department apparatus, patrol wagons, street cleaning apparatus, and ambulances): | | | |
| Number | 1,910 | 1,599 | 19.4 |
| Value | $9,875,467 | $11,521,291 | —14.3 |
| Commercial vehicles: | | | |
| Total number | 827,318 | 452,086 | 83.0 |
| Total value | $544,415,348 | $326,491,883 | 66.7 |
| Light delivery (less than 1 ton)— | | | |
| Number | 124,206 | 60,981 | 103.7 |
| Value | $63,942,347 | $33,882,564 | 88.7 |
| Trucks (1 ton and over)— | | | |
| Number | 261,458 | 266,492 | —1.9 |
| Value | $206,134,505 | $220,049,809 | —6.3 |
| Hearses and undertakers' wagons— | | | |
| Number | 2,318 | 2,200 | 5.4 |
| Value | $5,661,460 | $4,471,632 | 26.6 |
| Other— | | | |
| Number | 3,518 | ..... | .... |
| Value | $2,227,671 | ..... | .... |
| Chassis (commercial and bus [4])— | | | |
| Number | 455,818 | 122,413 | 256.0 |
| Value | $266,449,365 | $68,087,878 | 291.3 |
| Trailers: | | | |
| Number | 21,055 | 19,739 | 6.7 |
| Value | $10,051,946 | $7,212,074 | 39.4 |

[1] The pronounced increase between 1927 and 1929 is accounted for by the fact that during the year 1927 one important manufacturer operated on a normal-production basis during only a part of the year.
[2] Not yet ascertained; will be included in final report.
[3] Not reported separately.
[4] Combined in order to avoid disclosing output of individual establishments.

### Motor Vehicles Manufactured—Number, by Class: 1929

| | |
|---|---|
| Passenger vehicles (not including public conveyances), classified according to factory value: [1] | |
| Value up to $500 | 1,749,178 |
| $501 to $750 | 1,747,624 |
| $751 to $1,000 | 416,697 |
| $1,001 to $1,500 | 301,776 |
| $1,501 to $2,000 | 93,230 |
| $2,001 to $2,500 | 23,472 |
| $2,501 to $3,000 | 13,046 |
| $3,001 and up | 11,210 |
| Delivery wagons and trucks (complete vehicles and chassis), classified according to capacity: | |
| ¾ ton or less | 173,482 |
| 1 ton | 145,669 |
| Over 1 to 2½ tons, inclusive | 477,551 |
| 3 to 4½ tons, inclusive | 18,378 |
| 5 tons | 2,647 |
| Over 5 tons | 1,049 |

[1] Not including 76,009 passenger chassis.

## Jordan Plan Assured

NEW YORK, Dec. 16—Stockholders of Jordan Motor Car Co. have deposited a sufficient number of shares of common and preferred stock to assure carrying out of the reorganization plan announced sometime ago. This plan calls for the organization of a new company, Jordan Motors Corp., Inc., with capitalization of 500,000 shares of common stock. These shares are offered to stockholders in the old company on the basis of five shares for each share of preferred of the old and one share for each ten shares of common of the old held. In addition 150,000 shares of the new common are to be sold at $10 a share.

## Keller Addresses Dodge Dealers

CHICAGO, Dec. 15—More than 200 Dodge Brothers dealers and associates attended an all-day meeting with factory officials last Friday. K. T. Keller, vice-president and general manager of the Chrysler Corp., came to Chicago from Detroit to address the meeting. A. van DerZee, general sales manager of the company, who is conducting a tour of key cities, gave dealers detailed plans for new year operations.

## Budd Wheel Declares

PHILADELPHIA, Dec. 17—Directors of the Budd Wheel Co. have declared the usual extra dividend of 75 cents on the cumulative participating preferred. In addition the usual quarterly payments of 25 cents on the common and $1.75 on the participating preferred also were declared. All dividends payable Dec. 31.

## Seiberling Opens Branch

CHICAGO, Dec. 15—F. A. Seiberling, veteran tire manufacturer, addressed a group of Chicagoans last week with the formal opening of a new branch office at South Michigan Avenue and Twenty-first St. He stated that he expects the Chicago branch to do a yearly volume of business in excess of $2,500,000. Cy J. May is branch manager.

## Kissel is Reorganizing

HARTFORD, WIS., Dec. 15—Reorganization of the Kissel Motor Car Co., with offices and works here, is proceeding, and the company expects to make a formal announcement relative to 1931 operations in about 60 days, according to a statement by George A. Kissel, president.

## Sets Summer Meeting Date

NEW YORK, Dec. 16—Monday, June 15, to Friday, June 19, inclusive, are the dates finally decided upon for the 1931 Summer Meeting of the Society of Automotive Engineers, which will be held at White Sulphur Springs, West Va.

## Hudson Adds Workers

DETROIT, Dec. 16—More than 5700 men have been added to the Hudson-Essex employment total, the number of wage earners at the plant now being 9244, according to a statement by William J. McAneeny, president and general manager. This figure compares with 3500 a month ago. More men are being taken on, week by week, but it is emphasized that all of these are former employees who have been notified to return to work. Mr. McAneeny's statement said in part:

"Returning confidence is everywhere evident and it is as a result of this changed condition and the active buying of our new models that we are able to play this part to relieve unemployment in Detroit and in other centers from which we obtain our large supplies."

## Richard P. Joy Dies

DETROIT, Dec. 17—Richard P. Joy, 60 years old and director of the Packard Motor Car Co., died yesterday of a heart attack following an appendicitis operation.

## Stamped Parts Valued

WASHINGTON, Dec. 18—Stamped automotive parts and accessories to the value of $30,041,640 were produced in 1929, according to the Bureau of the Census.

## Durant Dealers Told of Change

### Michigan and California Units Issue Statement

NEW YORK, Dec. 17—William C. Durant, president of Durant Motors, Inc., and Norman de Vaux, president of Durant Motor Company of California, have sent to all Durant dealers and distributors the following letter:

"The undersigned corporations have by mutual consent terminated as of the close of the present year the license agreement under which the Durant Motor Company of California has since 1922 been manufacturing and distributing Durant automobiles.

"Commencing Jan. 1, 1931, the territory previously supplied by the Durant Motor Company of California will be served directly from the factory of Durant Motors, Inc., at Lansing, Michigan, and all manufacturing and sales rights for Durant products, as well as the right to the use of the name 'Durant,' will revert to Durant Motors, Inc.

"For Durant Motor Company of California (the name of which will be changed) an announcement will be made shortly by Mr. de Vaux regarding the future product and plans for the California company."

## Curtiss to Revise Challenger

NEW YORK, Dec. 17—Curtiss Aeroplane & Motor Co. will bring out shortly its refined Challenger 170 hp., six-cylinder, air-cooled radial engine. Among the refinements added to the 1931 model are Curtiss-Wright constant velocity cams, lead bronze-lined lower half shells fitted to master rods, redesigned heater valve controlling exhaust gas heat to carburetor, improved crankcase nose fitted with laminated shim to eliminate end play, substitution of copper asbestos gaskets for sheet gaskets where advisable, and air cleaner, complete, with by-pass valve supplied as standard equipment.

## Gadsden Plant to Step-Up

BIRMINGHAM, Dec. 18 — Goodyear Tire & Rubber Co. has announced that beginning Jan. 5 it will increase production at its Gadsden, Ala., plant with the addition of about 100 workers. Output is to be increased from 5400 tires to about 6000 tires per day. Additional machinery is being placed in the finishing and stock preparation department.

## Monarch Tractor to Add Men

SPRINGFIELD, ILL., Dec. 17—Force at the Monarch tractor division of the Allis-Chalmers Co. plant in this city will be increased 175 men before the first of the year. Orders sufficient to keep the plant operating full time for six months are now on hand.

## Olds Zone Managers Meet

DETROIT, Dec. 15—Chief executives of the General Motors Corp. were in attendance Tuesday at the second of a four-day meeting of Oldsmobile zone managers and distributors which opened Monday in the auditorium of the administration building, Olds Motor Works.

## Ford Plans New Seattle Plant

DETROIT, Dec. 17—Bids for a new Ford assembly plant at Seattle, Wash., to cost several million dollars, including site, building and equipment, will be let next month, officials of Ford Motor said today. The new plant, a modern two-story structure, will have a capacity of 300 cars and trucks a day and will employ 2000 men.

It will replace the present assembly plant in Seattle, which has a capacity of 115 cars a day. The plant site, comprising approximately 30 acres, is on East Marginal Way and on a slip from the Duwamish Waterway. A concrete dock 500 ft. long and 40 ft. wide will adjoin the building and permit ocean vessels to discharge their cargoes directly into the building.

The assembly building will be 750 ft. long and 320 ft. wide with a second story 750 ft. by 160 ft. The second floor will contain a modern body installation department with double chain automatic dip enamel ovens through which bodies will pass simultaneously on two conveyors for the drying of lacquer. The Seattle plant is the third to be built on the West Coast by the Ford Motor Co. within the last year or two. A new branch was recently opened at Long Beach, Calif., and another is under way at Richmond, Calif.

## Wisconsin Aircraft Sold

CHIPPEWA FALLS, WIS., Dec. 15—Dayton Kirby and Norman Deuel, both of this city, have taken over the Wisconsin Aircraft Co., established by R. C. Olson, and have also granted exclusive manufacturing rights to the Olson Song Bird, Fly Aire and Olson Sport ships, which he designed and patented. Mr. Olson will act as technical adviser for the new owners.

## Lincoln Prices Are Announced

### Range From $4,400 to $7,400, Including Custom Jobs

DETROIT, Dec. 18—Prices of the new Lincoln standard and custom body types, ranging from $4,400 to $7,400, were announced today by the Lincoln Motor Co. Steel spoke wheels are standard equipment on all types. The price of the various types, f.o.b. Detroit, are as follows:

Sport phaeton, $4,400 (with tonneau cowl and windshield, $4,600); sport touring, $4,400; five-passenger coupe; $4,600; town sedan, two window, $4,600; town sedan, three window, $4,600; five-passenger sedan, $4,700; seven-passenger sedan, $4,900; seven-passenger limousine, $5,100; chassis, $3,500.

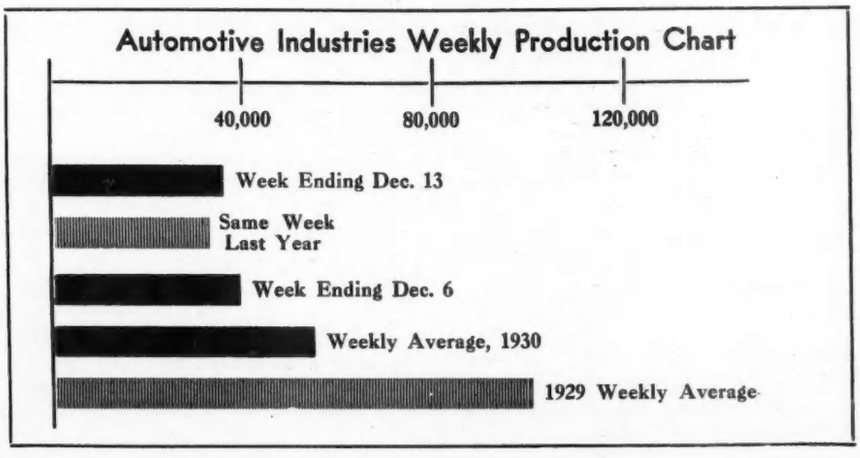
Convertible roadster, by LeBaron, $4,700; berline, two-window, by Judkins, $5,800; berline, three-window, by Judkins, $5,800; two-passenger coupe, by Judkins, $5,200; all-weather brougham, by Brunn, $7,200; all-weather cabriolet, by Brunn, $7,400; all-weather cabriolet, by LeBaron, $7,100; all-weather cabriolet, by LeBaron (semi-collapsible), $7,300; limousine, by Willoughby, $6,100; convertible sedan, by Dietrich, $6,800; convertible coupe, by Dietrich, $6,400; panel brougham, by Willoughby, $7,400; convertible phaeton, by Derham, $6,200.

## G.M. Truck Reduces Prices

DETROIT, Dec. 17—Effective immediately, price reductions of from $50 to $150 on three light-duty models and of $600 on all types of the six-wheel heaviest duty model, coupled with increases in guaranteed capacity ratings on seven models, have been announced by O. L. Arnold, vice-president, directing sales of the General Motors Truck Co. New prices follow: T-15, $645, down $50; T-17, $675, down $70; T-19, $745, down $150. Increases of from 500 to 530 lb. in guaranteed straight rating capacity (total gross weight including pay load) on models formerly in the 1½-ton, 2-ton, 2½-ton, 3-ton, 3½ and 4-ton ranges have been announced.

## Rolls Moves Hartford Branch

HARTFORD, CONN., Dec. 15—The Hartford branch of Rolls-Royce of America has removed its sales quarters to 336 Pearl Street. P. C. Nelson, manager of the branch, advises that the company has had a very good year in this territory.



## Michigan Employment Drops from October

### Payroll Decrease is Proportionate

DETROIT, Dec. 15—In the automobile industry in the state of Michigan as of Nov. 15, there were 175,073 employees, a decrease of 28,820 from the total of 203,893 in December, 1929, according to a report by the State Department of Labor and Industry, based on the reports of 50 companies. The aggregate weekly payroll for the automobile industry in the state during November was $4,918,105 as compared with $5,158,865 in October and $5,338,254 in December, 1929. The average weekly earnings per capita in the automobile industry were $28.09 in November, $27.56 in October and $26.18 in December, 1929.

## Tests Aero Engines in Field

PARIS, Dec. 4 (*by mail*)—Aviation engine altitude tests are carried out by the Alfa Romeo Co., of Milan, on the top of Mont Stelvio, 9840 ft. above sea level, by means of a mobile laboratory and test bench. The equipment consists of a 2-ton pneumatic-tired truck having an aviation engine support on the rear and a closed cabin in which all the instruments are grouped.

The general layout of the test bench is similar to that of the fixed test benches used at the factory with the advantage of being able to carry out tests at high altitudes and at low temperatures under natural conditions.

Accompanying the mobile test bench is a tank wagon carrying supplies.

## Perfex Enters P. C. Field

MILWAUKEE, Dec. 15—The Perfex Corp., 335 Oklahoma Avenue, manufacturer of radiators and cooling systems for heavy-duty gasoline engines for commercial cars and power machinery, has entered the field of passenger car radiators, it is announced. A new cellular type core unit is now in regular production and already is being furnished to a leading passenger car manufacturer. Some time ago the Perfex Corp. began diversifying its line by invading the unit heater field and a line of blast cores for process drying.

## Noblitt Reports Position

CHICAGO, Dec. 18—Noblitt-Sparks Industries' balance sheet as of Sept. 30 last, shows current assets of $2,023,374 and current liabilities of $627,625, as compared with $1,503,116 and $217,026 respectively, on Dec. 31, 1929, and profit-and-loss surplus of $753,362 compares with $649,931. Common stock, represented by 84,603 shares, was carried at $1,404,182, against 75,000 shares carried at $1,164,107 on Dec. 31 last.

## Financial Notes

**Aluminum Co. of America** has declared regular quarterly dividend of $1.50 on preferred, payable Jan. 1 to holders of record Dec. 15.

**Hercules Motor Corp.** has declared dividend of 30 cents, payable Jan. 1 to holders of record Dec. 19.

**McQuay-Norris Mfg. Co.** has declared an increased quarterly dividend of 75 cents, payable Jan. 2 to holders of record Dec. 22.

**Perfect Circle Co.** reports net earnings for the 11 months ended Nov. 30 of $603,-191, or $3.71 a share, on common stock. This compares with $883,279, or $5.43 a share, for the corresponding 11 months of last year.

**Spicer Mfg. Corp.** has declared regular quarterly dividend of 75 cents, payable Jan. 15 to holders of record Jan. 2.

**Willys-Overland Co.** has declared regular quarterly dividend of $1.75 on preferred, payable Jan. 2 to holders of record Dec. 26.

**Martin-Parry Corp.** has declared a special dividend of $4 a share as a result of the sale of its Indianapolis plant to General Motors.

**McCord Radiator & Mfg. Co.** has declared regular quarterly dividend of 75 cents on Class A stock, payable Jan. 2, to holders of record Dec. 23.

**Vichek Tool Co.** has declared regular quarterly dividend of 12½ cents on common and $1.75 on preferred, both payable Dec. 31, to holders of record Dec. 20.

## Rail Shipments Studied

DETROIT, Dec. 15—Continuing their study of automobile shipping by rail, highway and water lines, the railroad executives of lines operating in official classification territory, comprising the states of Illinois and those East, met at Detroit, Dec. 10, with a committee of traffic managers, members of the National Automobile Chamber of Commerce. No final conclusion was reached at the Dec. 10 meeting, the carriers stating that further time would be required for their studies.

## Autocar at Normal

PHILADELPHIA, Dec. 18—Announcement by Autocar Co. of Ardmore, of a return to full-time operation was made this week. Current bookings together with miscellaneous orders anticipated over the coming months are expected by Mr. Page to keep the plants operating at capacity throughout the winter months. At normal capacity the Autocar company employs about 1000 men. All the force has been recalled.

## Plans New Transmission

CHICAGO, Dec. 17—Preparations are being made by the Detroit Gear & Machine Co., division of Borg-Warner Corp., for the manufacture of a helical gear transmission that may be had with or without a synchronizer. This new transmission is of the constant-mesh type and permits very easy shifting.

## Mullins Employs More

SALEM, OHIO, Dec. 15—Prospects for a prosperous year were announced by officials of the Mullins Mfg. Co., body and parts manufacturers. With release recently of several large orders, 900 men, 500 more than were employed at this time last year, are on the plant's payroll.

## Chevrolet Begins Truck Body Plan

*(Continued from page 915)*

that these prices will be unusually low.

Following are the locations of the 52 branches: Detroit, Flint, Mich.; North Tarrytown, Buffalo, Syracuse and New York; St. Louis, Kansas City, Mo.; Minneapolis, Minn.; Oakland, Los Angeles, Calif.; Dallas, Houston, El Paso, Amarillo, San Antonio, Tex.; Atlanta, Ga.; Norwood, Cleveland, Ohio; Denver, Colo.; Chicago, Decatur, Ill.; Pittsburgh, Harrisburg, Philadelphia, Pa.; Baltimore, Md.; Charlotte, N. C.; Memphis, Knoxville, Tenn.; Davenport, Des Moines, Iowa; Portland, Ore.; Janesville, Wis.; Louisville, Ky.; Oklahoma City, Okla.; New Orleans, La.; Indianapolis, Fort Wayne, Ind.; Jacksonville, Fla.; Omaha, Neb.; Birmingham, Ala.; Boston, Mass.; Fargo, N. D.; Little Rock, Ark.; Columbia, S. C.; Salt Lake City, Utah; Richmond, Va.; Great Falls, Mont.; Charleston, W. Va.; Wichita, Kan.; Seattle, Wash.; Portland, Me. Buildings at these various points are being leased and range in size up to about 20,000 sq. ft. Approximately 40 are at present established.

## Cleveland Section Meets

CLEVELAND, Dec. 17—The Society of Automotive Engineers, Cleveland section, met at Hotel Statler on Monday, Dec. 15. Principal speakers of the occasion were W. E. Wickenden, president of Case Scientific School, and Professor Yale S. Nathanson, psychologist, University of Pennsylvania. Mr. Wickenden spoke on the Human Side of Engineering and Mr. Nathanson spoke on the Mental Gears of Engineers.

## Exhibit Program Set

NEW YORK, Dec. 15—Manufacturers of parts and accessories exhibiting in the New York and Chicago shows in January will pursue a program very similar to that pursued during the past two years.

The shop equipment section of the shows, which will be on the fourth floor of Grand Central Palace in New York and in the South Hall of the Coliseum at Chicago, will be devoted entirely to the trade during the hours from 10 a. m. to 5 p. m.

## Union Malleable Recalls Sixty

EAST MOLINE, ILL., Dec. 17—Sixty men returned to their places at the Union Malleable plant of Deere & Co. in this city this week. The additional force puts the plant on a 60 per cent capacity operating basis.

## Haynes Rejoins Franklin

SYRACUSE, Dec. 15—Frederick J. Haynes has rejoined Franklin as vice-president and member of the board of directors.

# Men of the Industry and What They Are Doing

## White Elects Bean

Robert W. Woodruff, chairman of the board of directors of the White Motor Co., Dec. 15, announced the election of Ashton G. Bean, of Cleveland and Elyria, Ohio, to succeed him as president of the company. Mr. Woodruff's retirement as president and Mr. Bean's election took place at a meeting of the directors in Cleveland on that date.

Since the death, in September, 1929, of Walter C. White, who was president and chairman of the board of the White company, Mr. Woodruff has held both of these offices and also the presidency of the Coca-Cola Co., Atlanta.

Further action of the meeting was the election of Mr. Bean and W. King White, president of the Cleveland Tractor Co., as directors of the White company.

Mr. Bean has been president of Bishop & Babcock Mfg. Co., Cleveland, for a number of years. This position brought him into close association with Walter C. Teagle, president of the Standard Oil Co. of New Jersey and a White director, and with the late Walter C. White.

## Christopher Succeeds Lefebvre at Oakland

George T. Christopher, formerly chief inspector of Olds Motor Works, has been appointed factory manager of the Oakland Motor Car Co., to succeed Gordon Lefebvre, former vice-president in charge of operation, resigned. Mr. Lefebvre has stated that he has no immediate plans but expects to rest for a few months before entering a new position.

## Messinger to Head Oliver

Effective Jan. 1, C. R. Messinger, president of Chain Belt Co., Milwaukee, will become president of the Oliver Farm Equipment Co., according to announcement made by Joseph D. Oliver, chairman of the board of the latter company. M. E. Ellis, who has been president since its organization, becomes vice-chairman of the board.

## Standards Body Elects

The American Standards Association has elected as president Bancroft Gherardi, vice-president and chief engineer of the American Telephone & Telegraph Co. Cloyd M. Chapman, engineering specialist, has been re-elected to vice-presidency of the association. The board of directors is as follows:

Quincy Bent, vice-president, Bethlehem Steel Co.; George K. Burgess, director U. S. Bureau of Standards; Cloyd M. Chapman, C. L. Collens, president, Reliance Electric & Engineering Co.; Howard Coonley, president, Walworth Co.; L. A. Downs, president, Illinois Central Railroad; F. E. Moskovics, president, Improved Products Corp.; W. J. Serrill, The United Gas Improvement Co.; M. S. Sloan, president, New York Edison Co. and Affiliated Companies, and R. J. Sullivan, vice-president, Travelers Insurance Co.

## Herrington is Named

A. W. Herrington has been named chairman of the Military Motor Transport Advisory Committee of the Society of Automotive Engineers which is being appointed to cooperate with the Quartermaster Corps of the U. S. Army. Additional appointments to this committee are expected within the next 30 days.

## Opel Returns to Europe

Dr. Fritz von Opel, general manager of the Opel Motor Works, Russelsheim, Germany, who has spent the past several months in this country, returned to Europe aboard the S. S. Europa Dec. 15. He is accompanied by Mrs. von Opel.

## Sherwin Names Cottingham

William C. Cottingham has been appointed as managing director of the Sherwin-Williams Co. of Canada, Ltd. He has for the last four years been assistant to the president.

## M. M. Roberts Shifts Position

M. M. Roberts, advertising department, Oldsmobile, has resigned to take a position in the sales department of Oakland.

## Cadillac Adds 2 Types

DETROIT, Dec. 20—A seven-passenger touring car by Fleetwood has been added to both the Cadillac V-Eight and V-12 lines, according to factory announcement this week. Production is getting under way on both models. The V-12 touring is on a 140-in. wheelbase and is priced f.o.b. Detroit at $4,295, with standard equipment. The V-Eight, on the regular 134-in. wheelbase, will sell for $3,195.

## Frank I. Harding Dies

BABSON PARK, FLA., Dec. 15—Frank I. Harding, widely known in automotive circles, died suddenly at his home here, Dec. 7, following a heart attack. Mr. Harding was formerly treasurer of the Peerless Motor Car Co., Cleveland.

## Automotive Steel Orders Being Placed

### Stabilization Rules Flat Steel Prices

NEW YORK, Dec. 18—Developments this week justified the expressions of steel producers earlier this month that they expected the beginning of a turn in the tide by the middle of December. Quite an encouraging tonnage of business has been placed by automotive consumers within the last few days, makers of full-finished automobile sheets reporting the best commitments from body-builders in some time. Flat steel prices have now settled on the basis of the minimums announced last month by the leading interest's sheet-rolling subsidiary.

Manufacturers of cold-finished steel bars are out with a circular letter to the trade, announcing that their industry is determined to continue the prevailing wage scale and asking the support of consumers in their efforts to avoid the necessity of cuts. The cold-finished steel bar production is declared to approximate one million tons a year.

Another of the week's interesting developments is that more than two score companies producing chrome-nickel steels under license from German patentees have agreed upon a set of standard ranges of contents and upon uniform designations for these by way of symbols. This reform creates a common language in that division of the steel industry, enabling purchasing agents to obtain competitive quotations by using the base symbols.

**Pig Iron**—A little more iron is being contracted for by automotive foundries for first quarter. Some foundries have started taking inventory and others will do so during the first week or two after the turn of the year. Prices are fairly steady.

**Aluminum**—Quiet and unchanged.

**Copper**—Electrolytic was offered by resellers at the beginning of the week at as low as 9¾c. Custom smelters asked a ¼c more. Buyers are neglecting the market. Declining consumption is now as much of a worry to producers as surplus stocks.

**Tin**—Straits tin broke to 23¾c at the beginning of the week. The effect of last week's stock market recession is thought to have been chiefly responsible for the sharp drop in tin prices on the London Metal Exchange.

**Lead**—Dull and steady.

**Zinc**—Zinc declined to 4.05c, East St. Louis, at the opening of the week, compared with 4.35c a month ago.

## Japan Plans Truck Subsidy

WASHINGTON, Dec. 16—In preparing the budget for the coming fiscal year, the government authorities of Japan have decided to include a subsidy of Yen 360,000 to be paid to domestic manufacturers of motor trucks and to users who purchase domestic motor trucks, according to the automotive division, Bureau of Foreign and Domestic Commerce. This is the army subsidy which has been paid for a number of years and under which all domestic manufacturers have been operating.

## General Motors Sales Exceed Output Again

### Shipments to Dealers Pass Nov., '29, Figure

NEW YORK, Dec. 16—For the first time in 1930 General Motors in November sold more cars to dealers than in the corresponding month of last year. Sales to dealers for that month were 48,155, as compared with 39,745 in November of 1929, and with 22,924 in October of the current year. This is due largely to the fact that Chevrolet introduced its new models during November and shipped large numbers of cars to its dealers in order that their stocks might be sufficient to meet the anticipated demand.

November was also the first month since May in which sales to dealers exceeded sales to consumers, due again to the building up of dealers stocks of new Model Chevrolets. Sales to consumers during the month were 41,757, as compared with 68,893 in November of last year, and with 57,757 in October of this year.

Total sales to dealers, including Canadian sales and overseas shipments, during November were 57,257, as compared with 60,977 in November of last year, and with 28,253 in October of this year.

Comparative figures follow:

| | Sales to Consumers 1930 | 1929 | Sales to Dealers 1930 | 1929 |
|---|---|---|---|---|
| Jan. | 74,167 | 73,989 | 94,458 | 95,441 |
| Feb. | 88,742 | 110,148 | 110,904 | 141,222 |
| Mar. | 123,781 | 166,942 | 118,081 | 176,510 |
| Apr. | 142,004 | 173,201 | 132,365 | 176,634 |
| May | 131,817 | 169,034 | 136,169 | 175,873 |
| June | 97,318 | 154,437 | 87,595 | 163,704 |
| July | 80,147 | 147,079 | 70,716 | 157,111 |
| Aug. | 86,426 | 151,722 | 76,140 | 147,351 |
| Sept. | 75,805 | 124,723 | 69,901 | 127,220 |
| Oct. | 57,757 | 114,408 | 22,924 | 98,559 |
| Nov. | 41,757 | 68,893 | 48,155 | 39,745 |
| Total | 999,721 | 1,454,576 | 967,408 | 1,499,370 |

| Total Sales to Dealers, Including Canadian and Overseas Shipments | 1930 | 1929 |
|---|---|---|
| Jan. | 106,509 | 127,580 |
| Feb. | 126,196 | 175,148 |
| Mar. | 135,930 | 220,391 |
| Apr. | 150,661 | 227,718 |
| May | 147,483 | 220,277 |
| June | 97,440 | 200,754 |
| July | 79,976 | 189,428 |
| Aug. | 85,610 | 168,185 |
| Sept. | 78,792 | 146,483 |
| Oct. | 28,253 | 122,104 |
| Nov. | 57,257 | 60,977 |
| Total | 1,094,107 | 1,859,045 |

Unit sales of Chevrolet, Pontiac, Oldsmobile, Marquette, Oakland, Viking, Buick, LaSalle and Cadillac passenger and commercial cars are included in the above figures.

## Reprints Highway Safety Codes

WASHINGTON, Dec. 15—The National Conference on Street and Highway Safety has announced that revised versions of the Uniform Vehicle Code, the Model Municipal Traffic Ordinance, and the Manual on Street Traffic Signs, Signals and Markings, incorporating the changes made at the Third National Conference on Street and Highway Safety, have been reprinted and are available from the offices of the conference in the Department of Commerce.

### EVENTS DURING NEW YORK SHOW WEEK

Auto. Merchants Asso., Pre-Show Dinner, Commodore ..... Jan. 2
Pierce-Arrow, Luncheon, Plaza Hotel, Jan. 3
International Registration, N.A.C.C. Office ..... Jan. 3
Studebaker Corp., Dinner, Commodore, Jan. 3
Franklin Mfg. Co., Luncheon, Commodore ..... Jan. 5
Packard Motor Car Co., Luncheon, Roosevelt, 12.15 noon ..... Jan. 5
Nat'l Auto. Dealers Asso., Meeting, Commodore ..... Jan. 5
International Luncheon, N.A.C.C. Office ..... Jan. 5
Hupp Motor Car Co., Luncheon, Commodore ..... Jan. 5
International Trade Conf., Meeting, N.A.C.C. Office ..... Jan. 5
Rubber Manufacturers Asso., Dinner, Commodore ..... Jan. 5
Metropolitan Section S.A.E., Dinner, Commodore ..... Jan. 5
Nat'l Asso. of Show & Asso. Mgrs., Luncheon, Roosevelt, 12.30 noon, Jan. 6
Auburn Automobile Co., Luncheon, Commodore ..... Jan. 6
Hupp Motor Car Co., Luncheon, Commodore ..... Jan. 6
Nat'l Auto. Chamber of Com., Banquet, Commodore ..... Jan. 6
Marmon Motor Car Co., Luncheon, Commodore ..... Jan. 7
Hupp Motor Car Co., Luncheon, Commodore ..... Jan. 7
Nat'l Auto. Chamber of Com., Directors' Meeting, N.A.C.C. Offices..Jan. 7
Federal Distributors, Meeting, Commodore ..... Jan. 7
Federal Distributors, Dinner, Commodore ..... Jan. 7
Motor & Equipment Asso., Dinner, Astor ..... Jan. 7
Chevrolet Motor Co., Dinner, Commodore ..... Jan. 7
Willys-Overland Co., Banquet, Commodore ..... Jan. 8
Olds Motor Co., Dinner, Hotel Astor, Jan. 8
Hupp Motor Car Co., Luncheon, Commodore ..... Jan. 8
Overseas Automotive Club, Dinner..Jan. 8

### EVENTS DURING CHICAGO SHOW WEEK

Chicago Auto Trade Asso., Pre-Show Dinner, Congress ..... Jan. 23
Pierce-Arrow, Luncheon, Stevens..Jan. 26
Franklin Mfg. Co., Luncheon, Blackstone ..... Jan. 26
Hupp Motor Car Co., Luncheon, Stevens ..... Jan. 26
Nat'l Auto. Dealers Asso., Meeting, Palmer House ..... Jan. 26
Studebaker Corp., Dinner, Sherman, Jan. 26
Hupp Motor Car Co., Luncheon, Stevens ..... Jan. 27
Federal Distributors, Meeting, Stevens, Jan. 27
Federal Distributors, Banquet, Stevens Jan. 27
Nat'l Auto. Dealers Asso., Banquet, Commodore ..... Jan. 27
Auburn Automobile Co., Luncheon, Stevens ..... Jan. 27
Packard Motor Car Co., Luncheon, Blackstone, 12.15 noon ..... Jan. 27
Nat'l Asso. of Show & Asso. Mgrs., Luncheon, Palmer House, 12.30 noon ..... Jan. 27
Hupp Motor Car Co., Luncheon, Stevens ..... Jan. 28
Nat'l Auto. Chamber of Com., Directors' Meeting, Stevens ..... Jan. 28
Marmon Motor Car Co., Luncheon, Palmer House ..... Jan. 28
Olds Motor Works, Dinner, Congress, Jan. 28
Willys-Overland Co., Banquet, Palmer House ..... Jan. 29

## Sees Danger in Proposal

NEW YORK, Dec. 15—Compelling the oil companies to divest themselves of their investments in pipe lines, as was proposed by the Association of Railway Executives a few weeks ago, would place an increased burden upon the consumer of petroleum products and would not in any wise benefit the railroads, according to a statement by E. B. Reeser, president of the American Petroleum Institute.

## Auburn Purchases $9,000,000 Worth

### Lists Contracts Awarded for Early 1931 Requirements

AUBURN, IND., Dec. 16—Auburn Automobile Company in the last ten days has placed order commitments in excess of $9,000,000 for materials to be used in its 1931 cars. Deliveries are to start at once. The orders cover only commitments for part of 1931.

The companies which have obtained contracts include:

Detroit Gear & Machine Co.; Universal Products Co.; Ternstedt Mfg. Co.; Motor Products Corp.; L. A. Young Industries; Deveraux Co.; Woodall Industries; American Metal Die Casting Co.; Long Mfg. Co.; Clayton & Lambert; Peter Smith Stamping Co.; Allied Products Co.; Acme Carpet Co.; Davis, Kraus & Miller; Dupont Corp.; H. Von Frankenberg; Herzon Zimmer Co., all of Detroit; Motor Wheel Co., Lansing; Golde Mfg. Co., Ypsilanti.

Midland Steel Co.; Columbia Axle Corp.; Graphite Bronze Co.; Payne & Williams; Ohio Rubber Co.; Precision Casting Co.; Steel Tubes Co.; Easy-on Cap Co.; Cleveland Varnish Co. and the Forbes Varnish Co., all of Cleveland.

B. F. Goodrich Rubber Co.; Firestone Tire & Rubber Co. and Goodyear Tire & Rubber Co., all of Akron.

Champion Spark Plug Co.; Libby-Owens; Lauders Bros.; Dura Mfg. Co.; Doehler Die Casting Co., of Toledo.

Defiance Pressed Steel Co., Defiance, Ohio; Mullins Mfg. Co., Salem; Columbia Brass & Fixture Co., Springfield; Dayton Wire Wheel Co., and Delco Products, Dayton.

Successful bidders in Indianapolis are: Schebler Carburetor Co.; Metal Auto Parts Co.; L. G. S. Devices Corp.; Arrow Supply Co.; Hide Leather & Belting Co.; Zenite Metal Co.; Sweitzer-Cummins Co., and the Oakes Co.

Connersville, Ind., companies are: Stant Machine & Tool Co.; Indiana Lamp Co., and Central Mfg. Co.

Other Indiana companies to get commitment orders are: Marion Malleable Co., Marion; Delco-Remy Corp., Anderson; Indiana Pressed Steel Co., Muncie; Excel Curtain Co., Elkhart, and Ross Gear & Tool Co., Lafayette.

## De Vaux Lets Contracts

LANSING, Dec. 16—Before leaving Lansing today, for California, Norman De Vaux, president of the newly formed De Vaux-Hall Motor Car Co., Oakland, Calif., announced that the company plans to build 100 cars per day at the beginning of its operations, and that 150,000 cars a year should be a conservative estimate for its future scale. Syracuse Gear Corp. has been given the contract for axles on the new car, and the Warner Gear Corp. contracts for the steering gear and transmission, he said. Other contracts will be let soon, according to Mr. De Vaux.

## Onyx Establishes Factory

SAN FRANCISCO, Dec. 15—Onyx Mfg. Co. has established a factory at 857 Alabama St., San Francisco, and will manufacture, from raw onyx, such automobile parts and accessories as gear shift balls, ornamental handles for doors, etc.

## Best Forms Automotive Division

NEW YORK, Dec. 16—Best Die Casting and Stamping Co. announces that it has formed an automotive division with Frank Mariani as secretary, and M. M. Rose as sales manager.

# United States' Cars Lead at Brussels, Belgian Industry Reviewed for the Year

BRUSSELS, Dec. 3 (*by mail*)—Out of a total of 334 exhibitors at the annual twenty-fourth Brussels automobile show, held in the Palais du Cinquentenaire, from Nov. 29 to Dec. 10, those of the United States headed the list with 26 makes in the passenger car section and 12 in the truck division. France came second with 20 makes of passenger cars and 10 truck builders. Other nations represented were Belgium, Germany, Italy and England.

The Belgian industry has been reduced to three passenger car makers producing on a big scale—Minerva, F.N. and Imperia—and three others producing in very small numbers. They are Astra, A.D.K. and Sizaire. Belgian truck makers are Minerva, Bovy, Brossel, Dasse and Pipe. Firms having ceased production during the last two years are Metallurgique, Nagant and Excelsior.

General Motors and Ford at Antwerp and Plymouth in Brussels are the only American firms now assembling in Belgium. The Chrysler assembling plant at Antwerp was shut down nearly a year ago. At the end of this year Ford will be using a new plant at Antwerp a few yards from the General Motors factory.

F.N. took advantage of the show to present a new straight eight with an L-head engine of 72 by 100 mm. bore and stroke, a downdraft carburetor, battery ignition, full pressure lubrication with an oil radiator, and having an American four-speed transmission and steering gear. The car has a wheelbase of 119 in.

Minerva has added a smaller eight, with a sleeve valve engine, the firm's line now being two eights and four sixes. In the truck section the greatest novelty was a Miesse coach chassis, with an engine mounted on the outside of each frame member and driving a rear wheel through worm gearing.

After disconnecting the open drive shaft, each unit can be removed and replaced in less than an hour by withdrawing four bolts, for the entire plant, comprising a four-cylinder overhead valve engine, clutch, three-speed transmission and radiator, is mounted in a subframe, which is carried on two transverse members extending beyond the side rails. Clutch and change speed control are united, the controls being carried up to the steering wheel at the front. The bus has a capacity of 80 passengers.

The Gauthier permanent hydraulic jack was exhibited in conjunction with the Dewandre Co., this consisting of four hydraulic jacks permanently attached to the side rails near the axles and four hand-operated pumps placed under the running board, or in any other convenient position. Being attached to the chassis, rigid piping can be used.

Soon after it is put into action, a stud on the cylindrical body of the jack is pushed out and passes under the spring. Pressure is obtained by driving the piston down the pump cylinder by means of a screw operated by a brace. As there are no valves, impurities in the liquid are of no importance, and discarded engine oil has been found to give satisfactory results.

## Durant Sues Brokers For $1,500,000 Loss

LANSING, MICH., Dec. 16—Suit to collect $1,500,000 damages from Benjamin Block & Co., New York brokerage house, has been filed in the Supreme Court of New Jersey by William C. Durant, president of Durant Motors, Inc., Henry F. Herbermann, secretary of the Durant Organization, announced here.

In the bill of complaint Mr. Durant charges the brokerage house with the unauthorized sale of 100,000 shares of stock in several other companies in which the automobile magnate is interested, and with the breaking of an agreement.

Other accounts in the suit which Mr. Durant is handling include those of Edward V. Rickenbacker, F. W. A. Vesper, of St. Louis, and R. Randolph Hicks, of New York.

Following closely the filing of suit by Mr. Durant, the Block organization, on Dec. 1, filed a suit for $71,000 against the motor chief in the Supreme Court of New York. This suit requests the court to order sufficient stocks sold to reimburse the Block company to the amount of $71,000. The Block firm held Mr. Durant's stock as collateral.

## M. & E. A. Plans Banquet

NEW YORK, Dec. 15—The Motor & Equipment Association will hold its annual show banquet Wednesday, Jan. 7, on the Hotel Astor roof. In conformity with this association's usual practice, the program will contain nothing but entertainment, the revue this time being built in a Spanish setting.

M. B. Ericson, Houdaille-Hershey Corp., is chairman of the banquet committee and is being assisted by C. H. Burr, SKF Industries, and George L. Brunner, Brunner Mfg. Co.

## Jordan Continues Line

CLEVELAND, Dec. 15—The Jordan Motor Car Co. announces continuation of their 1930 Standard Line Eighty's and Great Line Ninety's for the coming year. There will be no change in accessories or equipment.

## Canadian Cars Find New Outlet

### Treaty With Czecho-Slovakia Will Allow Entry

OTTAWA, Dec. 15—Nearly $500,000 new business for Canadian automobile manufacturers has been secured for them in one of the countries of continental Europe. As a result of negotiations recently conducted between Canadian trade officials in London, England, and on the Continent, a highly advantageous arrangement has been effected, it is understood, with Czecho-Slovakia.

While Canada has a trade treaty with that country, it was found that Canadian automobiles were not being admitted, and trade officials who are busy in most of the countries of Europe seeking new markets for Canadian goods consulted with the government at Prague, and it is believed a quota arrangement has been reached whereby Canada will be able to sell that country about 500 cars.

The new business is contingent upon the fulfillment by Canada of certain conditions, which apparently form no obstacle. One condition is a certificate to show that the cars are genuine Canadian cars, and not the make of some other country being shipped from Canada.

The new deal with Czecho-Slovakia is expected to be officially ratified within a short time, and it is understood that some Canadian automobile manufacturers are already in communication with the Department of Trade and Commerce to determine how they can best take advantage of the new market.

## Moller Gets Taxicab Order

WASHINGTON, Dec. 16—Announcement has been made by the M. P. Moller Motor Car Co., Hagerstown, Md., that for the second time within the past few months it has received an order for 500 taxicabs from the Paramount Taxi Co., New York. It was stated that the order means continuous employment until spring of several hundred men who were engaged when the first order for 500 taxicabs was received from the New York concern. The Moller company is the same organization which announced last week that it had received a contract to manufacture the new Martin midget car for the Martin Motor Car Corp. of Washington.

## Accident Deaths Decline

WASHINGTON, Dec. 15—During the four weeks ended Nov. 29, 78 large cities in the United States reported 796 deaths from automobile accidents. This figure compared with 839 reported from the same cities for the four weeks ending Nov. 30, 1929. The experience for the 52 weeks preceding Nov. 29 of this year was 8519 deaths against 8528 for the 52 weeks preceding Nov. 30 of last year.

## Business in Brief

**Written by the Guaranty Trust Co., New York, exclusively for Automotive Industries**

NEW YORK, Dec. 17—The return of relatively warm weather last week retarded retail trade in winter lines. Wholesale and jobbing lines were quiet, as were most industries. Some reports indicate that so far the level of holiday shopping has been about the same as a year ago, but prices all around are lower.

**DEPARTMENT STORE TRADE**

Department store trade during November, according to a preliminary report of the Federal Reserve Board, increased 2 per cent above that in the preceding month, which is somewhat less than the estimated seasonal increase for that time of year, but decreased 12 per cent below the level in the corresponding period last year. The total for the first 11 months of this year was 7 per cent below that a year ago.

**CONSTRUCTION AWARDS**

Construction contracts awarded in 37 Eastern States during November were valued at $253,573,700, according to the F. W. Dodge Corp., as against $337,301,400 during the preceding month and $391,012,500 a year ago. Total construction contracts awarded during the first 11 months of this year amounted to $4,275,598,600, as against $5,437,922,400 in the corresponding period last year.

**CAR LOADINGS**

Railway freight loadings for the week ended Nov. 29, totaled 702,085 cars, which marks a decrease of 134,225 cars below those a year ago and a decrease of 198,471 cars below those two years ago.

**CRUDE OIL OUTPUT**

Average daily crude oil production for the week ended Dec. 6 amounted to 2,229,250 bbl., as against 2,265,900 bbl. for the preceding week and 2,630,550 bbl. a year ago.

**FISHER'S INDEX**

Professor Fisher's index of wholesale commodity prices for the week ended Dec. 13 stood at 79.8, as against 80.7 the week before and 80.6 two weeks before.

**BANK DEBITS**

Bank debits to individual accounts outside of New York City for the week ended Dec. 10 were 22 per cent below those in the corresponding period last year.

**STOCK MARKET**

The stock market last week was under pressure, and prices moved almost steadily downward. It is reported that the suspension of the Bank of United States was the chief depressing influence. The railway, public utility, and high-priced industrial stocks were particularly depressed. Most issues showed net losses for the week, some of which were large.

# Chevrolet Moves to Stabilize Output; 30,000 Men to Get Steady Employment

DETROIT, Dec. 15—What represents probably the most important single step ever undertaken by a major automobile manufacturer in the direction of stabilization of employment and production is included in an announcement issued by W. S. Knudsen, president, and M. E. Coyle, vice-president, Chevrolet Motor Car Co., in Detroit, Saturday, Dec. 13th.

According to Mr. Coyle, Chevrolet expects to keep the 30,000 men employed in its plants since the inception of production on the new 1931 line of cars at constant employment throughout the winter. The company is now operating on a four-day week, eight hours per day for the day and night shifts each, in order to provide employment for the greatest number of men. This 32-hour weekly schedule will be adhered to, according to Mr. Coyle, until Chevrolet's employment reaches 40,000. If and when this total is reached it is probable that the working week will be increased to 50 hours before taking on any additional men.

"This decision to continue to operate our plants at a fairly high rate for this time of the year," Mr. Coyle stated, "does not mean that we will flood the market or our dealers with cars for which there is no immediate demand. Our idea is to assemble the machines and ship them only as required, carrying inventories in machined parts and sub-assemblies rather than in completed cars." By this means storage costs, of course, can be maintained at a much lower level.

Chevrolet's move will not only benefit its own employees, but will, of course, be reflected also in the ability of its parts suppliers to maintain production on an evener keel. Actual production schedules, according to Mr. Coyle, call for 60,000 cars only in December. November production was 47,000 units, which, with early introduction of new models this year, enabled Chevrolet to establish a high production record for any November.

Mr. Coyle estimates that Chevrolet's move of attempting to stabilize its winter employment at 30,000 men will mean a total employment of 100,000. This estimate is based on the fact that General Motors subsidiaries operating in conjunction with Chevrolet employ roughly one man for every one employed by the passenger car company. In addition to this, Mr. Coyle figures that work will be supplied to its materials and outside parts suppliers to the extent of calling for the employment of roughly 40,000 additional men. Chevrolet's own payroll, according to Mr. Coyle, who is general auditor of the company also, is now in the neighborhood of $1,000,000 per week.

Whether or not Chevrolet's effort to stabilize employment and production will be carried out also in other General Motors motor car plants could not be ascertained at the time. It will be recalled, however, that R. H. Grant, head of the general sales section of the General Motors Corp., some time ago, as reported in *Automotive Industries*, in addressing the production meeting of the Society of Automotive Engineers, predicted that a move toward general stabilization of production to lower the seasonal variations was imperative in the industry.

## Maryland Inspection Completed

BALTIMORE, MD., Dec. 15—Maryland's third annual Save-A-Life campaign ended on Dec. 1 and it was estimated immediately after it closed that there were several thousand cars that had not been inspected. Many of these, it was believed, were out of the state and provision was made for them to be inspected elsewhere.

Motor Vehicle Commissioner E. Austin Baughman, who headed the campaign, has announced that licenses for next year will not be issued for cars that have not been officially inspected and passed. The work of inspection was carried on by more than 700 official stations in all parts of Maryland.

## Hartford County Sales Off 30%

HARTFORD, CONN., Dec. 15—Hartford county passenger car sales in November dropped off about 30 per cent as compared with the same period of 1929. The loss for the calendar year was in like ratio. Nine Hartford dealers showed a gain in November as against 16 in October. December at least marked increased interest with indications of early improvement.

## Egypt Plans Exhibition

ALEXANDRIA, EGYPT, Nov. 5 (*by mail*)—An opportunity for American manufacturers of tractors and agricultural machinery to demonstrate their products in action will be provided by the fourteenth agricultural and industrial exhibition under the auspices of the Royal Agricultural Society of Egypt, to be held in Cairo, Feb. 15-March 16, 1931.

In making this announcement, Fouad Abaza, director of the Society, points out that in 1928 the United States supplied 90 per cent of the tractors imported into Egypt and that this percentage declined to 60 in 1929. A booklet explaining the objects of the agricultural exhibition has been prepared in French and English and may be obtained from: The Director, the Royal Agricultural Society of Egypt, P. O. Box 63, Cairo, Egypt.

## Automotive Issues Valued in Billions

### Stock Exchange Bulletin Gives Summary to Dec. 1

NEW YORK, Dec. 16—Common stocks listed on the New York Stock Exchange as of Dec. 1, 1930, included 61 issues of 59 companies in the automotive industries, with a total market value of $2,441,857,348, and an average price of $22.93 a share, according to the monthly bulletin of the Exchange. The total number of common shares listed was 106,473,252.

Of the latter number, 84,105,536 shares were divided among 26 issues by 24 automobile and truck manufacturing companies (and holding companies). The total market value of shares listed by this group was $2,053,266,294, with an average price of $24.41 per share.

Thirty-five automobile accessory manufacturing companies (and holding companies) had listed 35 issues, with a market value of $388,591,054, an average price of $17.37 per share. The number of shares listed for this group was 22,367,716.

Twelve preferred stock issues with a total market value of $224,323,308 were listed. This was divided among 2,718,391 shares with an average price of $82.52. The automobile and truck manufacturing group accounted for 7 preferred issues, comprising 2,410,232 shares with a total market value of $211,092,732, at an average price of $87.58.

The automobile accessory manufacturing group accounted for 5 issues including 308,159 shares, with a total market value of $13,229,576, at an average price of $42.93.

A resume of the above figures shows that the automotive industries had listed, as of Dec. 1, a total of 73 issues, with a total market value of $2,666,179,656.

## British Tire Exports Drop

WASHINGTON, Dec. 16—Exports of automobile casings from United Kingdom to foreign countries during the month of October, 1930, numbered 105,012 as compared to 107,810 in September, 1930, according to the rubber division, Bureau of Foreign and Domestic Commerce. The leading markets in October were: New Zealand, France, Irish Free State, Argentina, Netherlands, British Malaya, British South Africa and British India.

## Rubber Consumption Estimated

NEW YORK, Dec. 15—Crude rubber consumption during November was placed at 23,479 long tons, according to the Rubber Manufacturers Association. Imports during the month were 31,765 long tons. Crude rubber on hand and in transit as of Nov. 30 was 189,925 long tons and crude rubber afloat for United States ports on Nov. 30 was 52,538 long tons.

## + + CALENDAR + + OF COMING EVENTS

### SHOWS

Sioux City, Iowa, Automobile...Dec. 18-20
New York, National Automobile..Jan. 3-10
National Roadbuilders' Show and Convention, St. Louis .....Jan. 10-16
Buffalo, N. Y., Automobile.....Jan. 10-17
Newark, N. J., Automobile.....Jan. 10-17
Milwaukee, Wis., Automobile ..Jan. 10-18
Cincinnati, Automobile .....Jan. 11-17
Baltimore, Automobile .....Jan. 17-24
Boston, Automobile .....Jan. 17-24
Hartford, Conn., Automobile ..Jan. 16-24
Montreal, Automobile .....Jan. 17-24
Detroit, Mich., Automobile.....Jan. 17-24
Pittsburgh, Pa., Automobile ...Jan. 17-24
Louisville, Automobile .....Jan. 19-24
Omaha, Neb., Automobile.....Jan. 19-24
Rochester, Automobile .....Jan. 19-24
Washington, D. C., Automobile..Jan. 24-31
Chicago, National Automobile...Jan. 24-31
Cleveland, Ohio, Automobile....Jan. 24-31
Milan, Italy, Automobile.....Jan. 24-31
Los Angeles, Calif., Automobile, Jan. 24-Feb. 1
Portland, Me., Automobile .....Jan. 26-31
Springfield, Mass., Automobile..Jan. 26-31
Syracuse, N. Y., Automobile....Jan. 26-31
Wilkes-Barre, Pa., Automobile..Jan. 26-31
Lancaster, Pa., Automobile.....Jan. 27-31
Minneapolis, Minn., Automobile, Jan. 31-Feb. 7
St. Paul, Minn. (Joint show with Minneapolis .....Jan. 31-Feb. 7
San Francisco, Calif., Automobile, Feb. 1-8
Scranton, Pa., Automobile .....Feb. 2-7
St. Louis, Mo., Automobile.....Feb. 2-7
Camden, N. J., Automobile, Feb. 25-March 2
Denver, Automobile .....Feb. 9-14
St. Petersburg, Fla., Automobile.Feb. 9-14
Mankato, Minn., Automobile ...Feb. 11-14
Peoria, Ill., Automobile.....Feb. 11-15
Rapid City, S. D., Automobile..Feb. 12-16
Indianapolis, Ind., Automobile..Feb. 14-19
Providence, R. I., Automobile...Feb. 14-21
Quebec, Automobile .....Feb. 21-28
Des Moines, Automobile .....Feb. 23-28
Seattle, Wash., Automobile, Feb. 24-Mar. 1
Altoona, Pa., Automobile.....April 15-27
International Garage Exposition, Berlin, Germany .....May 9-Aug. 9

### CONVENTIONS

First International Aerial Safety Congress, Paris, France .....Dec. 10-23
American Management Asso. (Shop Methods Division), Pittsburgh, Pa. Dec. 11-12
Highway Research Board, Washington .....Dec. 11-12
National Research Council, Washton, D. C. .....Dec. 11-12
Motorcycle & Allied Trades Asso., Annual, New York City .....Jan. 7
Society of Automotive Engineers, Annual Dinner, New York .....Jan. 8
American Engineering Council Annual Meeting, Washington, D. C. Jan. 15-17
Society of Automotive Engineers, Annual Meeting, Detroit....Jan. 19-23
Natl. Association of Engine & Boat Manufacturers, New York City, Jan. 23
Natl. Paving Brick Mfg. Association, Pittsburgh, Pa. .....Feb. 4-6
Midwest Power Conference and Exhibition, Chicago .....Feb. 10-13
A. S. M. E. Fuels Meeting, Chicago, Feb. 11-13
Society for Steel Treating (National Western Metal and Machinery Exposition), San Francisco..Feb. 16-20
Southern Automotive Jobbers Association, Atlanta .....Feb. 19-21
Road Show and School, Wichita, Feb. 24-27
American Chemical Society, Indianapolis, Ind. .....March 30-April 4
Aeronautical Chamber of Commerce, Detroit .....April 11-19
U. S. Chamber of Commerce, Atlantic City .....April 28-May 1
International Chamber of Commerce, Washington, D. C.....May 4-9

### SALONS

Los Angeles, Calif., Biltmore, Hotel, Feb. 7-14
San Francisco, Calif., Palace Hotel, Feb. 21-28

NOTE: New York and Chicago Show Weeks' Events are listed on page 921 of the News Section.

## Ford Abandons Italian Project

### Fails to Meet With Government Approval

PARIS, Dec. 4 (*by mail*)—Unable to secure government approbation, the Ford-Isotta Fraschini scheme for the construction of Ford passenger cars and trucks in Italy has been abandoned. This combination provided for the erection of a factory adjoining the present Isotta Fraschini works in the suburbs of Milan, in which Ford cars would be built for the Italian market, and for the construction or sale in the United States of the Isotta Fraschini passenger car and Isotta Fraschini aviation engines.

Although entirely a private commercial enterprise, this scheme had to be submitted for government approval. Other Italian automobile manufacturing interests took advantage of this to organize opposition, among the arguments brought forth being the difficulty of preventing the manufacturing plant gradually transforming itself into an assembly plant for foreign built parts. The opposition brought so much pressure to bear that eventually Premier Mussolini intimated that he could not approve the plan. Without his approbation the scheme had to be abandoned.

This is the second time Ford has been checkmated in his endeavor to manufacture in Italy. More than a year ago it was proposed to erect a factory at Livorno, but this met with opposition largely on military grounds.

The deal with Isotta Fraschini looked much more favorable, for it guaranteed the manufacture of the complete car in Italy and a 50 per cent increase in the present export of Isotta Fraschini products. The present import duties into Italy are almost prohibitive, being 120 gold lire per 100 kilogrammes, plus 35 per cent of the value.

## May Require Safety Glass

HALIFAX, N. S., Dec. 15—A proposal for equipping all automobiles in Canada with safety glass will be advanced at the coming session of parliament by R. K. Smith, Conservative member for Cumberland, N. S. The text of the resolution for approval reads: "That on and after Aug. 31, 1931, it be made obligatory that all new automobiles made or sold in Canada have in the windshield, side, partition and rear windows shatterproof, non-shatterable glass."

## Du Brul to Preside at Session

CINCINNATI, Dec. 15—Ernest F. du Brul, general manager of the National Machine Tool Builders Association, has accepted an invitation to preside at the production session to be held during the annual meeting of the Society of Automotive Engineers.